UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Hydrologic Data for Urban Studies in the San Antonio, Texas Metropolitan Area, 1979-80

By Roberto Perez

Open-File Report 82-158

Prepared in cooperation with the
Texas Department of Water Resources

AUSTIN, TEXAS

FEBRUARY 1982

UNITED STATES DEPARTMENT OF THE INTERIOR

JAMES G. WATT, Secretary

GEOLOGICAL SURVEY

Dallas L. Peck, Director

Reproduced by the Texas Department of Water Resources as part of the continuing program of cooperation in water-resources investigations between the Department and the U.S. Geological Survey

---

This publication for sale by:

U.S. Geological Survey
Open-File Services Section
Branch of Distribution
Box 25425, Bldg. 41, Federal Center
Denver, CO 80225
PH: 303-234-5888

CONTENTS

Page

Metric converstions-- 6
Introduction--- 7
    Purpose and scope of this hydrologic-data report-------------------- 8
    Watershed features--- 8
    Climate-- 8
Hydrologic instrumentation--- 12
Data collection-- 12
    Precipitation--- 12
    Runoff-- 15
Summary of data for the 1979-80 water year-------------------------------- 15
    Annual-- 15
    Individual storms--- 21
Water quality--- 21
Selected references--- 25
Compilation of data--- 26
Station descriptions, discharge, and water-quality data at
  stations in the San Antonio area, 1979 water year:
Olmos Creek tributary at Farm Road 1535, Shavano Park, Tex.-------------- 27
Olmos Creek at Dresden Drive, San Antonio, Tex.-------------------------- 29
San Antonio River at San Antonio, Tex.------------------------------------ 32
Alazan Creek at St. Cloud Street, San Antonio, Tex.---------------------- 35
Harlandale Creek at West Harding Street, San Antonio, Tex.-------------- 37
West Elm Creek at San Antonio, Tex.--------------------------------------- 38
East Elm Creek at San Antonio, Tex.--------------------------------------- 40
Salado Creek tributary at Bitters Road, San Antonio, Tex.---------------- 42
Salado Creek (upper station) at San Antonio, Tex.------------------------ 44
Salado Creek (lower station) at San Antonio, Tex.------------------------ 47
Leon Creek tributary at Farm Road 1604, San Antonio, Tex.--------------- 50
Helotes Creek at Helotes, Tex.--- 52
Leon Creek tributary at Kelly Air Force Base, Tex.----------------------- 55
Daily and monthly rainfall summary, 1979 water year.--------------------- 58
Storm rainfall and runoff records for selected storms at
  continuous-record stream-gaging stations, 1979 water year:
    Olmos Creek at Dresden Drive, San Antonio, Tex.
        Storm of November 5, 1978--- 72
    Salado Creek (upper station) at San Antonio, Tex.
        Storm of April 20-21, 1979-- 74
    Leon Creek tributary at Kelly Air Force Base, Tex.
        Storm of April 19-21, 1979-- 76
    Olmos Creek tributary at FM 1535, Shavano Park, Tex.
        Storm of March 20-21, 1979-- 78
    Alazan Creek at St. Cloud Street, San Antonio, Tex.
        Storm of March 21-22, 1979-- 80
    Harlandale Creek at West Harding Street, San Antonio, Tex.
        Storm of April 20-21, 1979-- 82
        Storm of June 1, 1979--- 83
        Storm of June 5, 1979 -- 84
        Storm of July 5, 1979--- 85

CONTENTS--Continued

Page

Compilation of data--Continued

- Storm rainfall and runoff records for selected storms at flood-hydrograph partial-record stations, 1979 water year:
  - West Elm Creek at San Antonio, Tex.
    - Storm of January 10, 1979---------- 86
    - Storm of June 1, 1979---------- 87
  - East Elm Creek at San Antonio, Tex.
    - Storm of January 10, 1979---------- 88
    - Storm of June 1, 1979---------- 89
  - Salado Creek tributary at Bitters Road, San Antonio, Tex.
    - Storm of November 26, 1978---------- 90
    - Storm of March 15, 1979---------- 91
    - Storm of April 29, 1979---------- 92
    - Storm of June 1, 1979---------- 93
    - Storm of July 5, 1979---------- 94
  - Leon Creek tributary at FM 1604, San Antonio, Tex.
    - Storm of November 5, 1978---------- 95
    - Storm of December 31, 1978---------- 96
    - Storm of January 10, 1979---------- 97
    - Storm of March 20-21, 1979---------- 98
- Stations descriptions, discharge, and water-quality data stations in the San Antonio area, 1980 water year:
  - Olmos Creek at Dresden Drive, San Antonio, Tex.---------- 99
  - San Antonio River at San San Antonio, Tex.---------- 102
  - Lorence Creek at Thousand Oaks Boulvevard, San Antonio, Tex.---------- 103
  - West Elm Creek at San Antonio, Tex.---------- 105
  - East Elm Creek at San Antonio, Tex.---------- 107
- Salado Creek (upper station) at San Antonio, Tex.---------- 109
- Salado Creek (lower station) at San Antonio, Tex.---------- 110
- Helotes Creek at Helotes, Tex.---------- 111
- Daily and monthly rainfall summary, 1980 water year.---------- 112
- Storm rainfall and runoff records for selected storms at flood-hydrograph partial-record stations, 1980 water year:
  - Harlandale Creek at West Harding Street, San Antonio, Tex.
    - Storm of May 13, 1980---------- 122
    - Storm of August 10-11, 1980---------- 123
  - Salado Creek tributary at Bitters Road, San Antonio, Tex.
    - Storm of September 6, 1980---------- 125

ILLUSTRATION

Page

Figure 1. Map showing the physiography, drainage basins, and hydrologic-instrument installations in the San Antonio urban area-- 9

TABLES

Table 1. Drainage area, period of record, type of gage, and drainage-basin characteristics at gaging stations in the San Antonio urban area-------------------------------- 10
2. Weighted-mean precipitation factors for drainage basins above stations in San Antonio metropolitan area------------ 13
3. Peak elevations for selected floods at flood-profile partial-record stations (except as noted) in the Salado Creek watershed, 1979 water year-------------------- 16
4. Peak elevations for selected floods at flood-profile partial-record stations (except as noted) in the Salado Creek watershed, 1980 water year-------------------- 17
5. Peak elevations for selected floods at flood-profile partial-record stations (except as noted) on rectified channels of the San Antonio River and selected tributaries above the mouth of Salado Creek, 1979 water year-- 18
6. Peak elevations for selected floods at flood-profile partial-record stations (except as noted) on rectified channels of the San Antonio River and selected tributaries above the mouth of Salado Creek, 1980 water year-- 19
7. Weighted-storm rainfall for selected storms for areas upstream from continuous-record stations and flood-hydrograph partial-record stations, 1979 water-year-------- 22
8. Weighted-storm rainfall for selected storms for areas upstream from continuous-record stations and flood-hydrograph partial-record stations, 1980 water-year-------- 23

METRIC CONVERSIONS

The inch-pound units of measurement used in this report may be converted to metric units by using the following conversion factors:

From		Multiply by	To obtain	
Unit	Abbreviation		Unit	Abbreviation
inch	--	25.4	millimeter	mm
foot	--	.3048	meter	m
mile	--	1.609	kilometer	km
square mile	mi^2	2.590	square kilometer	km^2
cubic foot per second	ft^3/s	.02832	cubic meter per second	m^3/s
foot per mile	ft/mi	.189	meter per kilometer	m/km
acre-foot	--	1233	cubic meter	m^3
		.001233	cubic hectometer	hm^3

To convert degrees Celsius (°C) to degrees Fahrenheit (°F): °F=9/5 x °C+32.

HYDROLOGIC DATA FOR URBAN STUDIES IN THE SAN ANTONIO, TEXAS, METROPOLITAN AREA

1979-80

by
Roberto Perez
U. S. Geological Survey

INTRODUCTION

Hydrologic investigations of urban drainage basins in Texas were begun by the U.S. Geological Survey in 1954. These studies are now in progress in Austin, Houston, and San Antonio. Studies were completed in the Fort Worth metropolitan area at the end of the 1977 water year, and in the Dallas metropolitan area at the end of the 1979 water year.

The Geological Survey, in cooperation with the Texas Department of Water Resources, expanded the existing streamflow network in the San Antonio metropolitan area in May 1968 to begin urban hydrology studies in this area. In September 1968, the program was further expanded to include the collection of water-quality data.

The operation and maintenance of stations 08178000, San Antonio River at San Antonio; 08178700, Salado Creek (upper station) at San Antonio; and 08178800, Salado Creek (lower station) at San Antonio are funded by the San Antonio River Authority in conjunction with the Texas Department of Water Resources and the U.S. Geological Survey.

The operation and maintenance and collection of water-quality data at station 08178720, Lorence Creek at Thousand Oaks Blvd., San Antonio, station 08178640, West Elm Creek at San Antonio, and station 08178645, East Elm Creek at San Antonio, are funded by the Edwards Underground Water District in cooperation with the Texas Department of Water Resources and the U.S. Geological Survey. Station 08178640, West Elm Creek at San Antonio, and station 08178645, East Elm Creek at San Antonio will provide hydrologic data on similar and adjacent watersheds. The West Elm watershed is still predominately rural but is undergoing extensive urbanization in some areas. The East Elm watershed is relatively stable and undeveloped.

The objectives of the San Antonio urban hydrology study are:

1. To provide data showing the effects of various stages of urbanization on flood discharge and runoff.
2. To provide water-quality data on surface-water runoff from floods of various magnitudes, during all seasons of the year from areas with different types of urban development.

Annual publication of the San Antonio urban studies was initiated in 1969.

A defination of terms related to streamflow, water quality, and other hydrologic data, as used in this report, are defined in the U.S. Geological Survey's 1979 and 1980 "Water resources data for Texas" reports.

Purpose and Scope of this Hydrologic-Data Report

The purpose of this report is to present a compilation of hydrologic data collected by the U.S. Geological Survey in the San Antonio urban area for the 1979 water year (Oct. 1, 1978 to Sept. 30, 1979), and the 1980 water year (Oct. 1, 1979 to Sept. 30, 1980).

To facilitate the publication and distribution of this report certain material has been included that does not conform to the formal publication standards of the U.S. Geological Survey.

Watershed Features

The natural hydrologic features of watersheds in the San Antonio urban study are strongly affected by two physiographic regions, the Edwards Plateau and the West Gulf Coastal Plain, which are divided by the Balcones Escarpment (fig. 1).

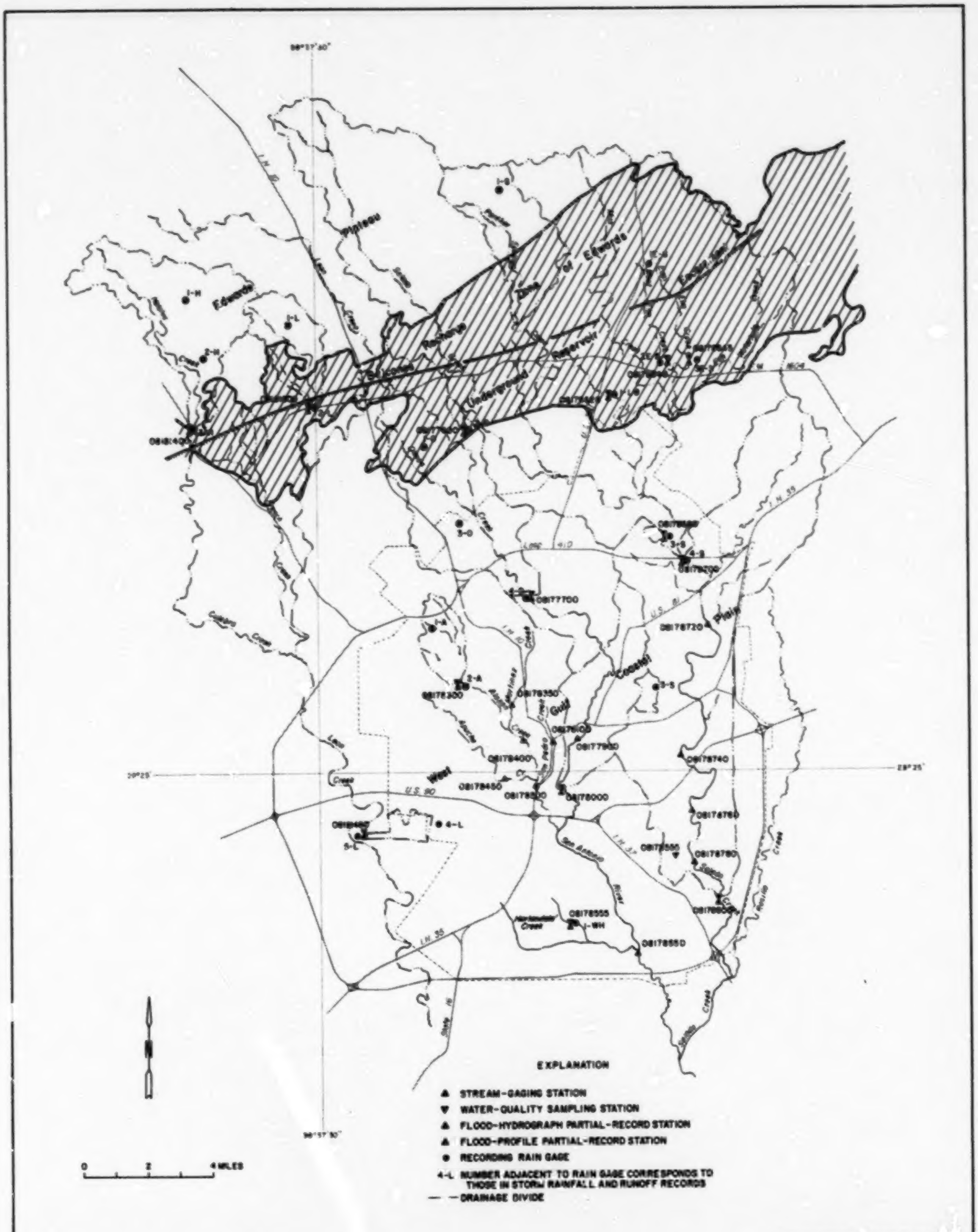
The Edwards Plateau has been eroded by streams into relatively steep and rugged topography, while the West Gulf Coastal Plain, which is rolling or moderately hilly near the Balcones Escarpment, has a more gentle relief in the southern part of the study area.

The recharge zone of the Edwards underground reservoir, as presented in chapter 20 of the rules of the Texas Department of Water Resources, is that area where surface water has the potential of entering the Edwards aquifer.

A summary of flood-hydrograph partial-record stations and continuous recording gaging stations and their watershed characteristics is given in table 1.

Climate

The climate of the area is modified subtropical with a prevailing south wind. Thunderstorms occur frequently in the spring and summer. Long-duration low-intensity storms triggered by southward-moving cold fronts occur during the fall and winter. Some of the heaviest rainfall occurs in late summer and early fall as a result of hurricanes moving inland from the Gulf of Mexico. Individual storms may cause serious flooding during any season but are most frequent in the spring. The normal rainfall for San Antonio, based on records of the National Oceanic and Atmospheric Administration, Enviromental Data Service for the period 1941-70, is 27.54 inches, with the largest average monthly rainfall occurring in May and September. The average annual temperature is 69°F (20.5°C).



98°37'30"
Edwards
Plateau
Zone of Edwards
Recharge
Underground Reservoir
Balcones
Escarpment
08181400
1-H
2-H
1-L
1-O
3-O
08177700
08178700
3-S
4-S
08178720
Plain
Coastal
Gulf
1-A
2-A
08178300
08178350
08178100
08177900
08178400
08178450
08178500
08178000
West
Leon
Creek
U.S. 90
Loop 410
U.S. 81
I.H. 10
I.H. 35
I.H. 37
08178740
08178760
08178780
08178800
08181480
4-L
5-L
San Antonio
River
08178565
1-WH
Harlandale Creek
08178550
Salado Creek
Martinez
Alazan
Apache
San Pedro
29°25'
EXPLANATION
▲ STREAM-GAGING STATION
▼ WATER-QUALITY SAMPLING STATION
▲ FLOOD-HYDROGRAPH PARTIAL-RECORD STATION
▲ FLOOD-PROFILE PARTIAL-RECORD STATION
● RECORDING RAIN GAGE
4-L NUMBER ADJACENT TO RAIN GAGE CORRESPONDS TO THOSE IN STORM RAINFALL AND RUNOFF RECORDS
— — DRAINAGE DIVIDE
0 2 4 MILES

Recharge Zone from chapter 20 of the rules of the Texas Department of Water Resources

FIGURE 1.-Physiography, drainage basins, and hydrologic-instrument installations in the San Antonio urban area

Table 1.--Drainage area, period of record, type of gage, and drainage-basin characteristics at gaging stations in the San Antonio urban area

Station number	Station name	Drainage area (mi^2)	Period of record	Type of gage	Watershed characteristics
08177600	Olmos Creek tributary at Farm Road 1535, Shavano Park, Tex.	0.33	1968-80	Flood-hydrograph partial-record	Watershed completely within the Edwards recharge zone; completely developed residential area with 3- to 4-acre home sites; rolling terrain.
08177700	Olmos Creek at Dresden Drive, San Antonio, Tex.	21.2	1968-80	Continuous-record	Central and upper reach located within the Edwards recharge zone; residential and commercial development in lower reach, predominantly rural in upper reach; rolling terrain.
08178000	San Antonio River at San Antonio, Tex.	41.8	1915-29, 1939-80	Continuous-record	Upper reach located within the Edwards recharge zone; residential and commercial development in lower reach, predominantly rural in upper reach; rolling terrain.
08178300	Alazan Creek at St. Cloud Street, San Antonio, Tex.	3.26	1968-79	Flood-hydrograph partial-record	Watershed completely within the West Gulf Coastal Plain; completely developed, residential and commercial; gentle to rolling terrain; considerable storm sewer development in lower reach.
08178555	Harlandale Creek at W. Harding St., San Antonio, Tex.	2.43	1977-80	Flood-hydrograph partial record	Watershed completely within the West Gulf Coastal Plain; residential and commerical development; gentle terrain; considerable storm sewer development.
08178620	Lorence Creek at Thousand Oaks Blvd., San Antonio, Tex.	4.05	1980	Flood-hydrograph partial-record	Watershed completely within Edwards recharge zone; residential and light commercial development; rolling terrain.
08178640	West Elm Creek at San Antonio, Tex.	2.45	1976-80	Flood-hydrograph partial-record	Watershed is completely within the Edwards recharge zone; predominantly rural; rolling to rugged terrain.
08178645	East Elm Creek at San Antonio, Tex.	2.33	1975-80	Flood-hydrograph partial-record	Watershed is completely within the Edwards recharge zone; predominantly rural; rolling to rugged terrain.
08178690	Salado Creek tributary at Bitters Road, San Antonio, Tex.	0.26	1968-80	Flood-hydrograph partial-record	Drainage area almost completely within the West Gulf Coastal Plain; completely developed residential area; gentle terrain; storm sewers in lower reach.
08178700	Salado Creek (upper station) at San Antonio, Tex.	137	1960-80	Continuous record	Central section of reach is within the Edwards recharge zone; limited amount of urban development in lower reach; predominantly rural in upper reach; rolling terrain.

Table 1.--Drainage area, period of record, type of gage, and drainage-basin characteristics at gaging stations in the San Antonio urban area--Continued

Station number	Station name	Drainage area (mi^2)	Period of record	Type of gage	Watershed characteristics
08178800	Salado Creek (lower station) at San Antonio Tex.	189	1960-80	Continuous-record	Upper section of watershed within the Edwards recharge zone; residential and commercial development in lower reach; predominantly rural in upper reach; rolling terrain.
08181000	Leon Creek tributary at Farm Road 1604, San Antonio, Tex.	5.57	1968-80	Flood-hydrograph partial-record	Lower reach of watershed is within the Edwards recharge zone; predominantly rural; rolling to rugged terrain.
08181400	Helotes Creek at Helotes, Tex.	15.0	1968-80	Continuous-record	Extreme lower reach is within the Edwards recharge zone; predominantly rural; rugged terrain.
08181450	Leon Creek tributary at at Kelly Air Force Base, Tex.	1.19	1969-79	Continuous-record	Watershed is completely within the West Gulf Coastal Plain; lower reach of watershed is developed by military for runways, offices, and warehouses; gentle terrain.

HYDROLOGIC INSTRUMENTATION

A partial list of gaging stations used in this report and the watershed characteristics at each of these stations are given in table 1. The locations of all hydrologic instrument installations for the San Antonio metropolitan area are shown on figure 1.

In addition to the staions listed in table 1, four flood-profile partial-record stations are located between the upper and lower stream-gaging stations on Salado Creek. In December 1972 and January 1973, seven flood-profile partial-record stations were installed at the request of the Corps of Engineers at sites on rectified channels of the San Antonio River and selected tributaries above the mouth of Salado Creek. Flood elevations for the flood-profile partial-record stations on Salado Creek and the San Antonio River are listed in tables 3 and 4.

DATA COLLECTION

Precipitation

Total precipitation and rainfall intensities were determined from 21 recording rain gages distributed throughout the study area (fig. 1). Daily and monthly precipitation is also shown for the rain gage at the San Antonio International Airport. Precipitation data for these rain gages are given in the section "Compilation of data."

Precipitation amounts in each drainage basin were compiled on a daily basis. A digital computer was used to process the large amounts of precipitation and runoff data. Precipitation at individual gages and weighted precipitation in each drainage basin for selected storms are given in the section "Compilation of data."

Rainfall for each basin was weighted by the Thiessen polygon method as described by Linsley, Kohler, and Paulhus (1949). The factors used to determine weighted-mean precipitation for each drainage basin are given in table 2. For example, the weighted-mean precipitation for the drainage basin upstream from the Olmos Creek at Dresden Drive station could be computed as follows: Multiply the recorded precipitation at rain-gage 1-0 by 0.34; to that value, add the recorded precipitation at rain-gage 2-0, multiplied by 0.18; to that value, add the recorded precipitation at rain-gage 3-0, multiplied by 0.40; and to that value, add the reocrded precipitation at rain-gage 4-0, multiplied by 0.08.

Table 2.--Weighted-mean precipitation factors for drainage basins above stations in the San Antonio metropolitan area

Station	Station number	Rain gage 1/	Weighted-mean precipitation factor 2/
		Continuous-record streamflow stations	
Olmos Creek at Dresden Drive, San Antonio	08177700	1-0	0.34
		2-0	.18
		3-0	.40
		4-0	.08
Salado Creek (upper station) at San Antonio	08178700	1-S	.68
		3-S	.22
		2-0	.08
		3-0	.02
Salado Creek (lower station) at San Antonio 3/	08178800	1-S	.50
		3-S	.20
		4-S	.10
		5-S	.13
		2-0	.06
		3-0	.01
Helotes Creek at Helotes	08181400	1-H	.70
		2-H	.25
		3-H	.05
Leon Creek tributary at Kelly AFB	08181450	4-L	.63
		5-L	.37
		Flood-hydrograph partial-record stations	
Olmos Creek tributary at FM 1535, Shavano Park	08177600	2-0	1.00
Alazan Creek at St. Cloud Street, San Antonio 3/	08178300	1-A	.73
		2-A	.27

See footnotes at end of table.

Table 2.--Weighted-mean precipitation factors for drainage basins above stations in the San Antonio metropolitan area--Continued

Station	Station number	Rain gage 1/	Weighted-mean precipitation factor 2/
Flood-hydrograph partial-record stations--Continued			
Harlandale Creek at W. Harding St., San Antonio	08178555	1-WH	1.00
Lorence Creek at Thousand Oaks Blvd., San Antonio	08178620	1-L0	1.00
West Elm Creek at San Antonio	08178640	1E-S	.58
		2E-S	.41
		3E-S	.01
East Elm Creek at San Antonio	08178645	1E-S	.55
		2E-S	.07
		3E-S	.38
Salado Creek tributary at Bitters Road, San Antonio	08178690	3-S	1.00
Leon Creek tributary at FM 1604, San Antonio	08181000	1-L	.77
		2-L	.23

1/ Rain gage designations are: 0, Olmos Creek; S, Salado Creek; H, Helotes Creek; L, Leon Creek; A, Alazan Creek; E-S, East Elm Creek, WH, Harlandale Creek, and L0, Lorence Creek.

2/ See section on "Precipitation" for explanation of use of weighted-mean precipitation factors.

3/ See table 1 for period of record.

Note: Where rain gage record was lost during a storm selected for analysis, that portion of the weighted-mean precipitation equation is prorated among the remaining rain gages in the equation.

Runoff

For the 1979 water year, runoff data from the San Antonio urban study area are based on discharge measurements and stage records at six continuous-record stream-gaging stations, seven flood-hydrograph partial-record stations, and water-surface elevations at eleven flood-profile partial-record stations. For the 1980 water year, one additional flood-hydrograph partial-record station is included. Daily discharge records for the six continuous-record stations and annual maximum discharge at the flood-hydrograph partial-record stations are given in the section "Compilation of data." Elevations for selected floods at four flood-profile partial-record stations and two stream-gaging stations are given in tables 3 and 4, and at seven flood-profile partial-record stations and one stream-gaging station in tables 5 and 6.

SUMMARY OF DATA FOR THE 1979-80 WATER YEARS

Annual

The average rainfall for the 1979 water year was determined from 21 rain gages and for the 1980 water year from 19 rain gages. The average rainfall in the San Antonio urban study area for the 1979 water year was 35.14 inches and for the 1980 water year it was 25.65 inches. Rainfall at the National Weather Service station located at the San Antonio International Airport was 38.79 inches for the 1979 water and 23.40 inches for the 1980 water year. Mean-annual precipitation at the National Weather Service station (at airport) for the 30-year period 1941-70 (calendar year) is 27.54 inches.

Runoff was compared with the long-term average at two selected stations. During the 1979 water year, runoff at station 08178000, San Antonio River at San Antonio, was 198 percent of the 54-year average of 56.1 ft^3/s. Runoff for station 08178800, Salado Creek (lower station) at San Antonio, was 140 percent of the 19-year average 43.1 ft^3/s. During the 1980 water year, runoff at station 08178000, San Antonio River at San Antonio, was 70 percent of the 55-year average of 55.8 ft^3/s. Runoff for station 08178800, Salado Creek (lower station) at San Antonio, was 81 percent of the 20-year average of 42.7 ft^3/s.

Table 3.--Peak elevations for selected floods at flood-profile partial-record stations (except as noted) in the Salado Creek watershed, 1979 water year

Station no.	Station name	Drainage area (mi^2)	Distance above mouth of Rosillo Creek (miles)	1979 Flood elevations										
				Nov. 5	Nov. 26	Jan. 10-11	March 21-22	April 20-21	April 29	May 11	June 1	July 5	July 18-19	July 27
08178700 a/	Salado Creek (upper station) at San Antonio, Tex.	137	20.7	687.81	691.18	690.22	688.62	694.34	690.10	682.82	692.40	687.66	687.71	688.62
08178720	Salado Creek at Rittiman Road at San Antonio, Tex.	--	17.8	655.08	656.76	--	655.31	660.97	657.24	--	659.92	654.75	654.67	655.92
08178740	Salado Creek at East Houston Street, San Antonio, Tex.	--	11.2	596.68	599.56	--	597.24	605.82	600.89	596.77	605.06	598.28	596.93	597.59
08178760	Salado Creek at U.S. Highway 87, San Antonio, Tex.	--	7.7	577.31	579.51	579.77	577.54	583.21	580.29	577.18	582.83	579.08	--	578.10
08178780	Salado Creek at Southcross Boulevard, San Antonio, Tex.	--	5.4	552.54	553.29	--	--	556.78	553.38	552.57	556.58	--	--	--
08178800 a/	Salado Creek (lower station) at San Antonio, Tex.	189	3.7	535.90	539.63	540.38	545.48	545.48	540.75	535.67	545.31	537.85	535.83	537.25

a/ Stream-gaging station.

Table 4.--Peak elevations for selected floods at flood-profile partial-record stations (except as noted) in the Salado Creek watershed, 1980 water year

Station no.	Station name	Drainage area (mi^2)	Distance above mouth of Rosillo Creek (miles)	1980 Flood elevations							
				Nov. 17	Dec. 29	Feb. 7	April 25	May 1	May 13	May 15	Sept. 6-7
08178720	Salado Creek at Rittiman Road at San Antonio, Tex.	--	17.8	--	--	--	--	655.91	655.72	655.91	656.48
08178740	Salado Creek at East Houston Street, San Antonio, Tex.	--	11.2	--	596.96	--	--	596.94	597.34	599.29	598.49
08178760	Salado Creek at U.S. Highway 87, San Antonio, Tex.	--	7.7	--	578.10	--	--	577.54	577.99	578.97	578.94
08178800 a/	Salado Creek (lower station) at San Antonio, Tex.	189	3.7	535.22	537.27	534.58	535.40	536.08	536.09	538.50	539.34

a/ Stream-gaging station.

Table 5.--Peak elevations for selected floods at flood-profile partial-record stations (except as noted) on rectified channels of the San Antonio River and selected tributaries above the mouth of Salado Creek, 1979 water year

Station no.	Station name	Drainage area (mi²)	Distance above mouth	1979 Flood elevations										
				Nov. 5	Nov. 26	Jan. 10-11	Mar. 21-22	April 20-22	April 29	May 11	June 1	July 5	July 18-19	July 27
08177900	San Antonio River at Navarro Street, San Antonio, Tex.	--	b/ 14.5	640.87	639.63	--	639.60	640.32	640.16	614.28	643.69	640.17	639.92	638.68
08178000 a/	San Antonio River at San Antonio, Tex.	41.8	b/ 12.7	614.53	614.44	613.08	612.58	614.60	615.28	638.67	617.67	615.64	612.01	--
08178100	San Pedro Creek at Santa Rosa Street, San Antonio, Tex.	--	3.7	640.87	641.13	639.51	639.50	639.05	645.07	--	641.58	638.98	640.66	--
08178350	Martinez Creek at Fredericksburg Road, San Antonio, Tex.	--	2.0	680.17	681.41	682.22	679.91	680.25	681.03	--	681.62	680.42	680.16	680.28
08178400	Alazan Creek at West Martin Street, San Antonio, Tex.	--	1.6	636.74	636.76	635.33	635.37	635.59	636.96	--	639.39	636.58	634.96	634.95
08178450	Apache Creek at South Zarzamora Street, San Antonio, Tex.	--	1.3	628.43	627.89	626.80	627.17	627.88	627.13	--	630.58	--	628.36	--
08178500	San Pedro Creek at Furnish Street, San Antonio, Tex.	--	1.7	603.45	603.51	602.26	602.12	602.43	603.21	--	607.19	602.27	601.56	--
08178550	San Antonio River at Ashley Street (Berg's Mill), San Antonio, Tex.	--	b/ 5.5	512.82	513.04	512.77	511.78	514.25	512.76	--	516.12	512.69	512.70	511.51

a/ Stream-gaging station.
b/ Distance above mouth of Salado Creek.

Table 6.--Peak elevations for selected floods at flood-profile partial-record stations (except as noted) on rectified channels of the San Antonio River and selected tributaries above the mouth of Salado Creek, 1980 water year

Station no.	Station name	Drainage area (mi²)	Distance above mouth	1980 Flood elevations								
				Nov. 17	Dec. 29	Feb. 7	April 25	May 1	May 13	May 13	May 15	Sept. 6
08177900	San Antonio River at Navarro Street, San Antonio, Tex.	--	b/ 14.5	--	638.58	--	--	639.87	638.92	638.92	640.34	639.62
08178000 a/	San Antonio River at San Antonio, Tex.	41.8	b/ 12.7	612.84	613.81	611.36	615.16	616.49	615.04	615.04	614.89	615.39
08178100	San Pedro Creek at Santa Rosa Street, San Antonio, Tex.	--	3.7	638.67	640.28	637.67	637.63	642.98	637.79	637.79	643.43	641.11
08178350	Martinez Creek at Fredericksburg Road, San Antonio, Tex.	--	2.0	678.90	679.97	678.58	680.13	680.16	679.93	679.93	680.32	681.83
08178400	Alazan Creek at West Martin Street, San Antonio, Tex.	--	1.6	--	635.46	--	634.20	634.73	634.88	634.88	636.17	--
08178450	Apache Creek at South Zarzamora Street, San Antonio, Tex.	--	1.3	--	627.02	--	--	628.72	--	--	627.42	627.52
08178500	San Pedro Creek at Furnish Street, San Antonio, Tex.	--	1.7	--	601.38	--	--	603.56	600.96	600.96	602.66	601.54
08178550	San Antonio River at Ashley Street (Berg's Mill), San Antonio, Tex.	--	b/ 5.5	--	511.26	--	--	513.90	512.42	512.42	513.32	512.84

a/ Stream-gaging station.
b/ Distance above mouth of Salado Creek.

Weighted-mean rainfall totals, total runoff, and rainfall-runoff ratio for five continuous recording streamflow stations representing basins in the San Antonio metropolitan area are as follows:

Station	Weighted-mean rainfall (inches)	Total runoff (inches)	Ratio of runoff to rainfall
	1979 water year		
Helotes Creek at Helotes (08181400)	a/ 38.68	6.84	0.18
Leon Creek tributary at Kelly Air Air Force Base (08181450)	30.92	4.69	.15
Olmos Creek at Dresden Drive, San Antonio (08177700)	34.48	3.16	.09
Salado Creek (upper station) at San Antonio (08178700)	a/ 40.69	1.23	.03
Salado Creek (lower station) at San Antonio (08178800)	a/ 38.80	4.35	.11
	1980 water year		
Helotes Creek at Helotes (08181400)	28.26	.01	.00
Olmos Creek at Dresden Drive, San Antonio (08177700)	25.14	1.24	.05
Salado Creek (upper station) at San Antonio (08178700)	24.59	.36	.01
Salado Creek (lower station) at San Antonio (08178800)	24.72	2.50	.10

a/ Corrected value.

Individual Storms

Storms producing the highest peak discharge in the San Antonio metropolitan area during the 1979 water year occurred on the following days: November 5-6, 26, and December 31, 1978; January 10, March 15, 20-21, April 20-21, 29, June 1, 5, and July 5, 1979. During the 1980 water year, peak discharge occured on May 18, August 10-11, and September 6-7, 1980. These storms produced a variety of rainfall amounts, intensities, durations, and distributions in the drainage basins. Weighted-storm rainfall for these storm periods at areas upstream from continuous-record streamflow stations and from selected flood-hydrograph partial-record stations are given in tables 7 and 8. Storm rainfall and runoff records are given in the section "Compilation of data."

Individual storms are not given for two stations during the 1979 water year. Storm rainfall data for station 08178800, Salado Creek (lower station) at San Antonio, and 08181400, Helotes Creek at Helotes were not analyzed because the unit runoff factor for the period of streamflow was low and not representative of basin conditions during flood runoff.

For the 1980 water year, individual storms are not given for the continuous-record stream-flow station because of the absence of major storms in the study area. Similarily, no individual storms are given for 08177600, Olmos Creek tributary at Shavano Park, 08178690, Salado Creek at Bitters Road, and 08181000, Leon Creek tributary at FM 1604. Individual storms given for the 1980 water year occurred on small, well-developed basins.

WATER QUALITY

The purpose of the San Antonio urban area water-quality program is to determine the variations of water quality under various hydrologic conditions for a period of 10 years or more. At the end of the data-gathering period, the results will be summarized and the water-quality variations will be evaluated. Urban planners can then use the results to help predict and better manage the water quality of the streams, reservoirs, and Edwards aquifer in the San Antonio area.

During the 1979 and 1980 water years, water-quality data were collected at 14 locations in the San Antonio urban area (figure 1). About five sets of waterquality samples were collected during storms at each site by Geological Survey personnel. When possible, sample bottles were filled by depth integration and insitu field readings were taken at points near the centroid of flow. When streams could not be waded safely, samples were collected at points near the bank in a few feet of water.

For each set of samples, dissolved oxygen, water temperature, and pH were determined at the time of collection. Specific conductance, carbonate, bicarbonate, and bacteria concentrations were determined within 6 hours of collection. Physical parameters, biochemical oxygen demand, total organic carbon, nutrients, MBAS (methylene blue active substances), and major ions were preserved and analyzed later.

Table 7.--Weighted-storm rainfall for selected storms for areas upstream from continuous-record stations and flood-hydrograph partial-record stations, 1979 water year

Rainfall period	Weighted rainfall, in inches											
	Stream-gaging stations					Flood-hydrograph partial-record stations						
	Helotes Creek at Helotes (08181400)	Leon Creek tributary at Kelly Air Force Base (08181450)	Olmos Creek at Dresden Drive, at San Antonio (08177700)	Salado Creek (upper station) at San Antonio (08178700)	Salado Creek (lower station) at San Antonio (08178800)	Olmos Creek tributary at FM 1535, Shavano Park (08177600)	Alazan Creek at St. Cloud Street, San Antonio (08178300)	Harlandale Creek at West Harding Street, San Antonio (08178555)	Salado Creek tributary at Bitters Road, San Antonio (08178690)	West Elm Creek at San Antonio (08178640)	East Elm Creek at San Antonio (08178645)	Leon Creek tributary at FM 1604, San Antonio (08181000)
Nov. 5			3.72									3.53
Nov. 26									1.92			
Dec. 31												1.75
Jan. 10										1.99	1.98	1.69
Mar. 15									0.90			
Mar. 20-21						1.41	0.82					2.42
Apr. 20-21		2.60		2.51				1.92				
Apr. 29									1.46			
June 1								2.90	3.67	3.48	3.73	
June 5								1.99				
July 5								1.22	1.64			

Table 8.--Weighted-storm rainfall for selected storms for areas upstream from continuous-record stations and flood-hydrograph partial-record stations, 1980 water year

Rainfall period	Weighted rainfall, in inches												
	Stream-gaging stations					Flood-hydrograph partial-record stations							
	Helotes Creek at Helotes (08181400)	Leon Creek tributary at Kelly Air Force Base (08181450)	Olmos Creek at Dresden Drive, at San Antonio (08177700)	Salado Creek (upper station) at San Antonio (08178700)	Salado Creek (lower station) at San Antonio (08178800)	Olmos Creek tributary at FM 1535, Shavano Park (08177600)	Alazan Creek at St. Cloud Street, San Antonio (08178300)	Harlandale Creek at West Harding Street, San Antonio (08178555)	Salado Creek tributary at Bitters Road, San Antonio (08178690)	West Elm Creek at San Antonio (08178640)	East Elm Creek at San Antonio (08178645)	Leon Creek tributary at FM 1604, San Antonio (08181000)
May 13							1.19					
Aug. 10-11							5.32					
Sept. 6-7								3.56				

The number of bacteria present in a water sample are reported as colonies per 100 milliliters of sample. Each individual plate count must be within a specified range of colonies (20 to 60 colonies for fecal coliform and 20 to 80 colonies for fecal streptococci) to be statistically valid. Those plate counts which do not fall within the specified range are based on "nonideal colony counts" and reported. The colony counts per 100 milliliters are footnoted with a "k" in the tables.

During the 1979 water year, water-quality samples were collected on the following days: January 10-11, February 23, March 15, 21-22, April 20-21, 29, June 1, and July 5, 18. During the 1980 water year, water quality samples were collected on December 28-31, and May 15. The analytical results for each set of samples can be compared to the magnitude of the peak discharge and the time of occurrence of storms. Time and discharge data for the respective storm peaks are given in the water discharge records section of each station under "Extremes for current year."

SELECTED REFERENCES

Arnow, Ted, 1959, Ground-water geology of Bexar County, Texas: Texas Board of Water Engineers Bull. 5911, 52 p.

Linsley, R. K., Kohler, M. A., and Paulhus, J. L. H, 1949, Applied hydrology: McGraw-Hill Book Company, Inc., New York, New York, 689 p.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration Environmental Data Service, 1972, Monthly normals of temperature, precipitation, and heating and cooling degree days, 1941-70, Texas: Climatography of the United States, no. 81 (by State).

U.S. Geological Survey, 1980, Water resources data for Texas, 1979, volume 3: U.S. Geological Survey water-data report TX 79-3, 619 p.

________1981, Water resources data for Texas, 1980, volume 3: U.S. Geological Survey water-data report, TX 80-3, 583 p.

U.S. Soil Conservation Service, 1966, Soil survey of Bexar County, Texas: U.S. Dept. of Agriculture, ser. 1962, no. 12, 125 p.

COMPILATION OF DATA

GUADALUPE RIVER BASIN

08177600 OLMOS CREEK TRIBUTARY AT FARM ROAD 1535, SHAVANO PARK,TX
(Flood-hydrograph partial-record station)

LOCATION.--Lat 29°34'35", long 98°32'45", Bexar County, Hydrologic Unit 12100301, at culvert on Farm Road 1535 at Shavano Park and 1.9 mi (3.1 km) southeast of intersection of Farm Roads 1535 and 1604.

DRAINAGE AREA.--0.33 mi² (0.85 km²).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1968 to current year.

GAGE.--Digital recorders (stage and rainfall) and crest-stage gages. Datum of gage is 907.92 ft (276.734 m) National Geodetic Vertical Datum of 1929, San Antonio supplementary adjustments of 1951 and 1953.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 303 ft³/s (8.58 m³/s) Sept. 26, 1973, gage height, 6.26 ft (1.908 m).

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 45 ft³/s (1.27 m³/s) Mar. 21, gage height, 3.12 ft (0.951 m), no peak above base of 50 ft³/s (1.42 m³/s); water-quality samples were made on this date.

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical, biochemical, and pesticide analyses: May 1970 to current year. Water temperatures: May 1970 to current year. Bacteria analyses: April 1976 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979

DATE	TIME	STREAM-FLOW, INSTANTANEOUS (CFS)	SPECIFIC CONDUCTANCE (MICRO-MHOS)	PH (UNITS)	TEMPERATURE (DEG C)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (NTU)	OXYGEN DEMAND, BIOCHEMICAL, 5 DAY (MG/L)	COLIFORM, TOTAL, IMMED. (COLS. PER 100 ML)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML)	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARDNESS (MG/L AS CACO3)
MAR												
21...	0230	44	143	8.1	16.5	220	85	4.6	K90000	32000	150000	57
21...	0440	32	167	8.1	16.0	280	50	4.4	K91000	K65000	K260000	68

DATE	HARDNESS, NONCARBONATE (MG/L CACO3)	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	SODIUM ADSORPTION RATIO	POTASSIUM, DISSOLVED (MG/L AS K)	BICARBONATE (MG/L AS HCO3)	CARBONATE (MG/L AS CO3)	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)
MAR												
21...	3	21	1.1	3.5	.2	5.2	66	0	7.5	4.0	.0	12
21...	6	25	1.4	3.3	.2	5.4	76	0	11	5.4	.0	15

DATE	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	SOLIDS, RESIDUE AT 105 DEG. C, SUSPENDED (MG/L)	SOLIDS, VOLATILE, SUSPENDED (MG/L)	NITROGEN, NITRATE TOTAL (MG/L AS N)	NITROGEN, NITRITE TOTAL (MG/L AS N)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N)	NITROGEN, AMMONIA TOTAL (MG/L AS N)	NITROGEN, ORGANIC TOTAL (MG/L AS N)	NITROGEN,AMMONIA + ORGANIC TOTAL (MG/L AS N)	PHOSPHORUS, TOTAL (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)	METHYLENE BLUE ACTIVE SUBSTANCE (MG/L)
MAR												
21...	87	164	36	.23	.02	.25	.06	1.3	1.4	.43	20	.00
21...	104	44	20	.31	.04	.35	.04	.96	1.0	.37	16	.10

DATE	TIME	ARSENIC DISSOLVED (UG/L AS AS)	BARIUM, DISSOLVED (UG/L AS BA)	CADMIUM DISSOLVED (UG/L AS CD)	CHROMIUM, DISSOLVED (UG/L AS CR)	COPPER, DISSOLVED (UG/L AS CU)	IRON, DISSOLVED (UG/L AS FE)
MAR							
21...	0230	1	10	<1	0	20	110
21...	0440	1	10	<1	0	13	100

DATE	LEAD, DISSOLVED (UG/L AS PB)	MANGANESE, DISSOLVED (UG/L AS MN)	MERCURY DISSOLVED (UG/L AS HG)	SELENIUM, DISSOLVED (UG/L AS SE)	SILVER, DISSOLVED (UG/L AS AG)	ZINC, DISSOLVED (UG/L AS ZN)
MAR						
21...	2	3	.0	0	0	20
21...	0	3	.0	0	0	10

08177600 OLMOS CREEK TRIBUTARY AT FARM ROAD 1535, SHAVANO PARK, TX--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979

DATE	TIME	PCB, TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)	CHLOR-DANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DI-AZINON, TOTAL (UG/L)
MAR								
21...	0230	.0	.00	.0	.00	.00	.00	.37
21...	0440	.0	.00	.0	.00	.00	.00	.16

DATE	DI-ELDRIN TOTAL (UG/L)	ENDO-SULFAN, TOTAL (UG/L)	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTA-CHLOR, TOTAL (UG/L)	HEPTA-CHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALA-THION, TOTAL (UG/L)	METHYL PARA-THION, TOTAL (UG/L)
MAR									
21...	.00	.00	.00	.00	.00	.00	.01	.61	.00
21...	.00	.00	.00	.00	.00	.00	.00	.00	.00

DATE	METHYL TRI-THION, TOTAL (UG/L)	MIREX, TOTAL (UG/L)	PARA-THION, TOTAL (UG/L)	TOX-APHENE, TOTAL (UG/L)	TOTAL TRI-THION (UG/L)	2,4-D, TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)	SILVEX, TOTAL (UG/L)
MAR								
21...	.00	.00	.00	0	.00	.00	.01	.00
21...	.00	.00	.00	0	.00	.00	.04	.00

GUADALUPE RIVER BASIN

08177700 OLMOS CREEK AT DRESDEN DRIVE, SAN ANTONIO, TX

LOCATION.--Lat 29°29'56", long 98°30'36", Bexar County, Hydrologic Unit 12100301, on right bank 30 ft (9 m) downstream from low-water bridge on Dresden Drive at San Antonio, 0.15 mi (0.24 km) west of intersection of Blanco Road and Dresden Drive, and 4.0 mi (6.4 km) upstream from Olmos Dam.

DRAINAGE AREA.--21.2 mi² (54.9 km²).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1968 to current year.

GAGE.--Water-stage recorder. Datum of gage is 726.10 ft (221.315 m) National Geodetic Vertical Datum of 1929.

REMARKS.--Water-discharge records good. Recording rain gage located at station, with three additional recording rain gages located in watershed. City of San Antonio rain gage and gage-height telemeters at station.

AVERAGE DISCHARGE.--11 years, 4.60 ft³/s (0.130 m³/s), 2.95 in/yr (75 mm/yr), 3,330 acre-ft/yr (4.11 hm³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,450 ft³/s (211 m³/s) Sept. 13, 1978, gage height, 14.82 ft (4.517 m), from floodmark; no flow at times.
Maximum stage since 1935, that of Sept. 13, 1978.

EXTREMES OUTSIDE PERIOD OF RECORD.--Floods in September and November 1947 reached a stage of 8.5 ft (2.59 m), from information by local resident.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 400 ft³/s (11.3 m³/s) and maximum (*):

Date	Time	Discharge (ft³/s)	Discharge (m³/s)	Gage height (ft)	Gage height (m)	Date	Time	Discharge (ft³/s)	Discharge (m³/s)	Gage height (ft)	Gage height (m)
Nov. 5	1930	882	25.0	6.95	2.118	Apr. 21	0030	932	26.4	7.08	2.158
Nov. 26	0900	530	15.0	b5.89	1.795	aApr. 29	0900	577	16.3	6.05	1.844
aJan. 10	1915	336	9.52	5.14	1.567	aJune 1	1130	*1,080	30.6	b7.44	2.268
aMar. 15	1215	187	5.30	4.38	1.335						

a Water-quality samples were obtained on this date.
b From floodmark.

Minimum discharge, no flow at times.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.2	.63	1.2	28	.82	.33	1.4	1.6	173	.10	.03	.00
2	1.6	.57	1.1	3.5	.72	3.4	4.8	1.9	4.5	.05	.00	.01
3	1.1	.66	1.2	1.5	2.4	8.2	1.4	1.5	.65	.05	.00	.08
4	1.1	.78	.63	2.6	7.5	.30	.91	1.3	.32	.07	.00	.15
5	1.1	168	.80	2.6	8.5	.33	1.0	1.2	89	45	.00	.27
6	.93	26	.61	1.9	11	.33	1.1	1.3	2.6	.98	.03	.10
7	.68	.59	.67	1.4	1.4	.34	1.2	1.3	.61	12	.00	.05
8	4.5	.32	.59	1.2	.82	.33	1.2	1.2	.71	3.6	.00	.04
9	1.6	.30	.63	1.4	.62	.40	1.2	.82	.43	.11	.00	.05
10	1.2	.38	.63	81	.54	8.5	1.1	.90	.22	.14	.01	.05
11	.93	.59	.63	28	.54	1.2	.99	5.1	.25	.08	1.5	.05
12	.80	1.2	.63	3.0	.54	.95	.89	.84	.26	.06	14	.03
13	.79	1.1	.63	1.4	.54	.99	1.1	.67	.21	.07	.01	.06
14	.32	.95	.72	1.2	.62	.97	1.1	.74	.22	.11	.01	.09
15	.18	15	.72	1.2	.62	20	1.2	.71	.20	.15	.01	.09
16	.18	8.2	.65	1.2	.38	2.0	1.2	.66	.20	.07	.01	.08
17	.11	2.7	.63	1.3	.38	5.6	20	.67	.21	.09	.02	.09
18	.08	.77	.72	5.2	.38	.66	3.3	.66	.19	55	.04	2.0
19	.08	3.5	.72	2.2	.46	.40	28	.67	.16	1.8	.01	1.4
20	.14	3.5	.79	7.6	.54	.71	14	.98	.17	.49	.01	.24
21	.18	1.0	.75	.93	.46	71	243	.75	.18	.17	.05	.09
22	.23	.72	.72	.93	.46	24	3.6	12	.19	.12	.00	.07
23	.23	.72	.77	.82	1.2	1.4	1.6	.73	.14	.15	2.6	.10
24	.36	.72	.94	.72	.45	1.0	1.4	.66	.15	.15	.20	.11
25	1.9	.72	1.1	3.3	.24	.96	1.5	.54	.12	.15	.00	.10
26	4.9	121	1.1	2.6	.35	.90	1.4	.58	.12	.05	.00	.09
27	1.7	4.0	.92	.82	.41	.78	1.6	.59	.11	46	.00	.09
28	.75	1.0	.87	.62	.35	.75	1.7	4.2	.12	.33	.00	.08
29	.72	.85	.92	5.0	---	.99	93	.33	.12	.01	.00	.10
30	.66	1.1	.95	1.3	---	1.7	4.0	.63	.10	.00	.01	1.1
31	.63	---	24	.72	---	1.2	---	.63	---	.00	.00	---
TOTAL	31.88	367.57	47.94	195.16	43.24	160.62	439.89	46.74	275.46	167.15	18.55	6.88
MEAN	1.03	12.3	1.55	6.30	1.54	5.18	14.7	1.51	9.18	5.39	.60	.23
MAX	4.9	168	24	81	11	71	243	12	173	55	14	2.0
MIN	.08	.30	.59	.62	.24	.30	.89	.54	.10	.00	.00	.00
CFSM	.05	.58	.07	.30	.07	.24	.69	.07	.43	.25	.03	.01
IN.	.06	.64	.08	.34	.08	.28	.77	.08	.48	.29	.03	.01
AC-FT	63	729	95	387	86	319	873	93	546	332	37	14
(††)	.36	6.36	1.71	3.12	1.16	3.14	5.86	1.05	4.87	4.48	1.20	1.17

CAL YR 1978 TOTAL 2183.72 MEAN 5.98 MAX 791 MIN .00 CFSM .28 IN 3.83 AC-FT 4330 †† 35.36
WTR YR 1979 TOTAL 1801.08 MEAN 4.93 MAX 243 MIN .00 CFSM .23 IN 3.16 AC-FT 3570 †† 34.48

†† Weighted-mean rainfall, in inches, based on four rain gages.

08177700 OLMOS CREEK AT DRESDEN DRIVE, SAN ANTONIO, TX--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical, biochemical, and pesticide analyses: November 1968 to current year. Sediment analyses: October 1972 to September 1973. Water temperatures: November 1968 to current year. Bacteria analyses: April 1976 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979

DATE	TIME	STREAMFLOW, INSTANTANEOUS (CFS)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)	TEMPERATURE (DEG C)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (NTU)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)	OXYGEN DEMAND, BIOCHEMICAL, 5 DAY (MG/L)
JAN										
10...	1505	81	210	7.4	7.0	90	380	10.8	92	7.1
10...	1610	81	196	6.9	6.0	180	560	--	--	11
11...	0940	28	231	6.9	5.5	180	120	11.0	90	2.9
MAR										
15...	1250	140	177	8.2	12.0	100	260	9.2	87	6.3
JUN										
01...	1536	81	134	8.0	22.5	100	430	8.2	96	3.8

DATE	COLIFORM, TOTAL, IMMED. (COLS. PER 100 ML)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML)	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARDNESS (MG/L AS CACO3)	HARDNESS, NONCARBONATE (MG/L CACO3)	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	SODIUM ADSORPTION RATIO	POTASSIUM, DISSOLVED (MG/L AS K)
JAN										
10...	94000	6200	72000	86	8	31	2.1	9.1	.4	3.3
10...	65000	6400	63000	69	8	25	1.5	8.9	.5	3.0
11...	57000	5900	84000	95	14	35	1.8	8.0	.4	3.6
MAR										
15...	K28000	K7600	66000	60	19	23	.6	4.4	.2	2.3
JUN										
01...	220000	K38000	45000	54	4	20	.9	4.3	.3	3.1

DATE	BICARBONATE (MG/L AS HCO3)	CARBONATE (MG/L AS CO3)	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	SOLIDS, RESIDUE AT 105 DEG. C, SUSPENDED (MG/L)	SOLIDS, VOLATILE, SUSPENDED (MG/L)
JAN									
10...	95	0	17	11	.1	7.1	128	720	185
10...	74	0	14	8.0	.1	5.5	103	1220	150
11...	98	0	15	7.8	.1	9.9	130	160	40
MAR									
15...	50	0	--	--	.1	3.5	--	518	152
JUN									
01...	60	0	5.1	4.4	.1	5.6	73	760	132

DATE	NITROGEN, NITRATE TOTAL (MG/L AS N)	NITROGEN, NITRITE TOTAL (MG/L AS N)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N)	NITROGEN, AMMONIA TOTAL (MG/L AS N)	NITROGEN, ORGANIC TOTAL (MG/L AS N)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N)	PHOSPHORUS, TOTAL (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)	METHYLENE BLUE ACTIVE SUBSTANCE (MG/L)
JAN									
10...	.37	.06	.43	.02	.48	.50	.56	20	.00
10...	.42	.12	.54	.02	.35	.37	.89	28	.00
11...	.79	.02	.81	.01	.37	.38	.24	12	.00
MAR									
15...	.57	.14	.71	.23	.36	.59	.12	15	.10
JUN									
01...	.44	.10	.54	.07	--	--	--	21	.00

GUADALUPE RIVER BASIN

08177700 OLMOS CR AT DRESDEN DRIVE, SAN ANTONIO, TX--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979

DATE	TIME	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)	COPPER, DIS-SOLVED (UG/L AS CU)
JAN						
10...	1505	1	30	<1	0	3
10...	1610	2	20	<1	0	5
11...	0940	1	20	<1	0	5
MAR						
15...	1250	2	0	0	10	0

DATE	IRON, DIS-SOLVED (UG/L AS FE)	LEAD, DIS-SOLVED (UG/L AS PB)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MERCURY DIS-SOLVED (UG/L AS HG)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	ZINC, DIS-SOLVED (UG/L AS ZN)
JAN							
10...	80	10	20	.0	0	1	<3
10...	100	15	20	.0	0	1	<3
11...	110	2	10	.0	0	1	<3
MAR							
15...	90	3	20	.0	0	0	10

DATE	TIME	PCB, TOTAL (UG/L)	NAPH-THA-LENES, POLY-CHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)	CHLOR-DANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DI-AZINON, TOTAL (UG/L)
JAN									
10...	1505	.0	--	.00	.2	.00	.01	.01	.12
10...	1610	.0	--	.00	.3	.00	.01	.02	.13
11...	0940	.0	--	.00	.0	.00	.00	.00	.05
MAR									
15...	1250	.0	--	.00	.3	.01	.01	.01	.61
JUN									
01...	1536	.0	.00	.00	.1	.00	.00	.00	.48

DATE	DI-ELDRIN TOTAL (UG/L)	ENDO-SULFAN, TOTAL (UG/L)	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTA-CHLOR, TOTAL (UG/L)	HEPTA-CHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALA-THION, TOTAL (UG/L)	METHYL PARA-THION, TOTAL (UG/L)
JAN									
10...	.01	.00	.00	.00	.02	.01	.01	.04	.00
10...	.00	.00	.00	.00	.04	.01	.04	.41	.00
11...	.00	.00	.00	.00	.00	.00	.00	.01	.00
MAR									
15...	.01	.00	.00	.00	.01	.01	.03	.23	.00
JUN									
01...	.01	.00	.00	.00	.01	.01	.00	.02	.00

DATE	METHYL TRI-THION, TOTAL (UG/L)	MIREX, TOTAL (UG/L)	PARA-THION, TOTAL (UG/L)	TOX-APHENE, TOTAL (UG/L)	TOTAL TRI-THION (UG/L)	2,4-D, TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)	SILVEX, TOTAL (UG/L)
JAN								
10...	.00	.00	.00	0	.00	.00	.01	.00
10...	.00	.00	.00	0	.00	.02	.02	.00
11...	.00	.00	.00	0	.00	.00	.00	.00
MAR								
15...	.00	.00	.00	0	.00	.46	.11	.01
JUN								
01...	.00	.00	.00	0	.00	.03	.04	.00

GUADALUPE RIVER BASIN

08178000 SAN ANTONIO RIVER AT SAN ANTONIO, TX

LOCATION.--Lat 29°24'34", long 98°29'41", Bexar County, Hydrologic Unit 12100301, on left bank 193 ft (59 m) downstream from South Alamo Street Bridge in San Antonio, 2.1 mi (3.4 km) upstream from San Pedro Creek, and 230.6 mi (371.1 km) upstream from mouth.

DRAINAGE AREA.--41.8 mi² (108.3 km²). Flow of river comes from intermittent spring flow and from artesian wells; drainage area of streams not applicable.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--December 1895 to June 1906 periodic discharge measurements only, January 1915 to November 1929, February 1939 to current year. Ground-water discharge into river is discussed by Petit and George, Texas Board of Water Engineers Bull. 5608, vol. 1 (1956, p. 45).

REVISED RECORDS.--WSP 1312: 1917. WSP 1923: Drainage area. WRD TX-72-1: 1971(m).

GAGE.--Water-stage recorder and concrete control. Datum of gage is 605.26 ft (184.483 m) National Geodetic Vertical Datum of 1929. Jan. 26, 1915, to Feb. 27, 1916, nonrecording gage at site 1.3 mi (2.1 km) upstream at different datum. Feb. 28, 1916, to Apr. 7, 1920, nonrecording gage at site 1.1 mi (1.8 km) upstream at different datum. Apr. 8, 1920, to Nov. 16, 1929, and Feb. 15, 1939, to Apr. 25, 1967, water-stage recorder in vicinity of South Alamo Street Bridge at 7.00-foot (2.134 m) higher datum. Apr. 25, 1967, to May 13, 1969, water-stage recorder at site 307 ft (94 m) downstream at same datum.

REMARKS.--Water-discharge records good. Floodflow is regulated by Olmos flood-control reservoir, capacity 15,500 acre-ft (19.1 hm³) about 8.5 mi (13.7 km) upstream. Dam completed in 1926. Springs emerge intermittently from the Edwards and associated limestones along the Balcones Fault Zone. City of San Antonio rain gage and gage-height telemeters at station.

AVERAGE DISCHARGE.--54 years, 56.1 ft³/s (1.589 m³/s), 18.23 in/yr (463 mm/yr), 40,640 acre-ft/yr (50.1 hm³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 15,300 ft³/s (433 m³/s) Sept. 10, 1921, gage height, 20.14 ft (6.139 m), from floodmark, at former site and datum, from rating curve extended above 2,000 ft³/s (56.6 m³/s) on basis of slope-area measurement of peak flow; no flow at times due to regulation.
Maximum stage since 1819, that of Sept. 10, 1921.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 5, 1819, equaled or exceeded that of Sept. 10, 1921.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,340 ft³/s (94.6 m³/s) June 1, gage height, 12.41 ft (3.783 m); no flow at times due to regulation.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	50	30	85	135	92	83	117	166	1060	37	85	80
2	49	29	91	66	97	160	154	178	656	34	80	76
3	47	28	92	63	102	126	117	193	206	31	82	75
4	45	29	90	67	127	83	116	150	217	29	79	92
5	43	286	72	77	153	82	107	175	801	281	77	76
6	28	266	98	74	154	81	117	190	264	32	79	77
7	41	45	88	67	88	79	119	172	208	40	75	60
8	48	51	89	71	92	82	120	173	207	55	71	73
9	46	52	85	69	93	78	119	172	208	42	69	88
10	43	54	82	319	95	101	120	173	203	57	67	66
11	42	54	79	257	94	80	118	230	211	35	94	66
12	52	55	82	68	94	70	116	147	215	45	169	68
13	40	59	85	83	94	76	117	159	204	46	80	53
14	37	56	84	81	94	75	108	157	198	43	62	64
15	36	66	84	95	97	183	103	152	195	40	74	58
16	39	98	83	74	102	122	112	149	187	41	75	60
17	36	50	79	85	102	139	168	150	181	34	79	59
18	35	57	81	108	102	102	109	173	175	356	72	104
19	34	72	81	113	102	105	170	201	158	85	73	74
20	32	66	64	120	102	100	156	197	136	122	72	70
21	31	50	77	89	102	193	672	228	136	74	70	68
22	30	59	75	92	104	188	178	306	139	76	67	68
23	32	57	77	92	113	96	158	158	106	78	106	67
24	31	60	73	89	104	111	166	203	94	67	92	67
25	51	62	76	111	100	109	169	199	85	84	80	64
26	47	335	77	114	102	119	172	196	100	131	78	64
27	34	74	73	94	98	114	169	205	88	188	77	62
28	33	62	74	94	106	115	169	344	55	100	75	59
29	32	85	74	122	---	111	505	202	34	82	75	57
30	34	105	75	97	---	126	191	217	36	91	80	53
31	32	---	161	81	---	118	---	195	---	82	66	---
TOTAL	1210	2452	2586	3167	2905	3407	5032	5910	6763	2538	2478	2068
MEAN	39.0	81.7	83.4	102	104	110	168	191	225	81.9	79.9	68.9
MAX	52	335	161	319	154	193	672	344	1060	356	169	104
MIN	28	28	64	63	88	70	103	147	34	29	62	53
CFSM	.93	1.96	2.00	2.44	2.49	2.63	4.02	4.57	5.38	1.96	1.91	1.65
IN.	1.08	2.18	2.30	2.82	2.59	3.03	4.48	5.26	6.02	2.26	2.21	1.84
AC-FT	2400	4860	5130	6280	5760	6760	9980	11720	13410	5030	4920	4100

CAL YR 1978 TOTAL 22964.2 MEAN 62.9 MAX 1160 MIN 1.6 CFSM 1.51 IN 20.44 AC-FT 45550
WTR YR 1979 TOTAL 40516.0 MEAN 111 MAX 1060 MIN 28 CFSM 2.66 IN 36.06 AC-FT 80360

GUADALUPE RIVER BASIN

08178000 SAN ANTONIO RIVER AT SAN ANTONIO, TX--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical, biochemical, and pesticide analyses: November 1968 to current year. Sediment analyses: May 1970 to September 1973. Water temperatures: November 1968 to current year. Bacteria analyses: May 1976 to current year.

REMARKS.--Peak discharges for storm events during which water-quality samples were obtained are given in the following table:

Date	Time	Discharge (ft^3/s)	Discharge (m^3/s)	Gage height (ft)	Gage height (m)
Mar. 21	1215	292	8.27	7.13	2.173
Apr. 29	0730	1,640	46.4	10.02	3.054
July 5	0930	1,210	34.3	9.31	2.838

WATER QUALITY DATA, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979

DATE	TIME	STREAM-FLOW, INSTANTANEOUS (CFS)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)	TEMPERATURE (DEG C)	COLOR (PLATINUM COBALT UNITS)	TURBIDITY (NTU)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)	OXYGEN DEMAND, BIOCHEMICAL, 5 DAY (MG/L)
MAR 21...	0828	193	513	7.7	20.0	45	190	8.3	93	5.4
APR 29...	0937	866	265	8.5	21.5	20	100	8.2	96	12
MAY 02...	0905	178	458	7.5	20.0	--	2.0	--	--	--
JUN 01...	1144	2830	125	7.9	22.1	70	300	8.2	95	5.3
JUL 05...	1336	7.4	172	7.8	25.5	45	40	7.4	91	9.6

DATE	COLIFORM, TOTAL, IMMED. (COLS. PER 100 ML)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML)	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARDNESS (MG/L AS CACO3)	HARDNESS, NONCARBONATE (MG/L CACO3)	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	SODIUM ADSORPTION RATIO	POTASSIUM, DISSOLVED (MG/L AS K)
MAR 21...	360000	K26000	130000	210	42	66	10	21	.6	3.4
APR 29...	120000	32000	47000	110	16	34	6.4	5.1	.2	3.0
MAY 02...	--	--	--	240	26	76	12	7.3	.2	.9
JUN 01...	310000	84000	110000	50	50	16	2.4	3.3	.2	2.4
JUL 05...	450000	250000	150000	75	13	24	3.7	4.0	.2	3.0

DATE	BICARBONATE (MG/L AS HCO3)	CARBONATE (MG/L AS CO3)	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	SOLIDS, RESIDUE AT 105 DEG. C, SUSPENDED (MG/L)	SOLIDS, VOLATILE, SUSPENDED (MG/L)
MAR 21...	200	0	52	26	.2	11	288	314	76
APR 29...	116	0	14	7.1	.1	9.5	137	352	45
MAY 02...	260	0	22	13	.2	10	270	0	0
JUN 01...	--	--	4.2	4.1	.1	3.1	36	828	156
JUL 05...	76	0	14	5.6	.1	4.4	96	141	20

DATE	NITROGEN, NITRATE TOTAL (MG/L AS N)	NITROGEN, NITRITE TOTAL (MG/L AS N)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N)	NITROGEN, AMMONIA TOTAL (MG/L AS N)	NITROGEN, ORGANIC TOTAL (MG/L AS N)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N)	PHOSPHORUS, TOTAL (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)	METHYLENE BLUE ACTIVE SUBSTANCE (MG/L)
MAR 21...	.54	.04	.58	.04	1.3	1.3	.320	21	.10
APR 29...	.96	.04	1.0	.23	1.6	1.8	.360	8.8	.10
MAY 02...	--	--	--	--	--	--	--	--	--
JUN 01...	.51	.06	.57	.11	2.3	2.4	.660	36	.00
JUL 05...	.59	.08	.67	.05	.93	.98	.340	20	.20

GUADALUPE VIER BASIN

08178000 SAN ANTONIO RIVER AT SAN ANTONIO, TX--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979

DATE	TIME	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, DIS-SOLVED (UG/L AS FE)
MAR 21...	0828	2	60	<1	10	11	10
APR 29...	0937	1	0	0	0	1	30

DATE	LEAD, DIS-SOLVED (UG/L AS PB)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MERCURY DIS-SOLVED (UG/L AS HG)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	ZINC, DIS-SOLVED (UG/L AS ZN)
MAR 21...	3	2	.0	0	0	6
APR 29...	11	20	.0	1	0	20

DATE	TIME	PCB, TOTAL (UG/L)	NAPH-THA-LENES, POLY-CHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)	CHLOR-DANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DI-AZINON, TOTAL (UG/L)
MAR 21...	0828	.1	--	.00	.3	.00	.01	.03	.00
APR 29...	0937	.4	.00	.00	.2	.00	.00	.20	.20
JUN 01...	1144	.5	.00	.00	1.6	.00	.09	.35	.31

DATE	DI-ELDRIN TOTAL (UG/L)	ENDO-SULFAN, TOTAL (UG/L)	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTA-CHLOR, TOTAL (UG/L)	HEPTA-CHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALA-THION, TOTAL (UG/L)	METHYL PARA-THION, TOTAL (UG/L)
MAR 21...	.00	.00	.00	.00	.01	.00	.01	.00	.00
APR 29...	.03	.00	.00	.00	.00	.00	.00	.00	.00
JUN 01...	.00	.00	.00	.00	.00	.00	.00	.07	.00

DATE	METHYL TRI-THION, TOTAL (UG/L)	MIREX, TOTAL (UG/L)	PARA-THION, TOTAL (UG/L)	TOX-APHENE, TOTAL (UG/L)	TOTAL TRI-THION (UG/L)	2,4-D, TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)	SILVEX, TOTAL (UG/L)
MAR 21...	.00	.00	.00	0	.00	.01	.04	.00
APR 29...	.00	.00	.00	0	.00	.01	.00	.00
JUN 01...	.00	.00	.00	0	.00	.58	.25	.00

GUADALUPE RIVER BASIN

08178300 ALAZAN CREEK AT ST. CLOUD STREET, SAN ANTONIO, TX
(Flood-hydrograph partial-record station)

LOCATION.--Lat 29°27'29", long 98°32'59", Bexar County, Hydrologic Unit 12100301, at bridge on St. Cloud Street in San Antonio and 1.5 mi (2.4 km) upstream from Woodlawn Lake Dam.

DRAINAGE AREA.--3.26 mi^2 (8.44 km^2).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1968 to September 1979 (discontinued).

GAGE.--Digital recorders (stage and rainfall) and crest-stage gages. Gage not referenced to National Geodetic Vertical 1929.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,380 ft^3/s (124 m^3/s) May 8, 1975, elevation, 16.08 ft (4.901 m).

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 400 ft^3/s (11.3 m^3/s) and maximum (*):

Date	Time	Discharge (ft^3/s)	Discharge (m^3/s)	Elevation (ft)	Elevation (m)	Date	Time	Discharge (ft^3/s)	Discharge (m^3/s)	Elevation (ft)	Elevation (m)
Nov. 5	unknown	731	20.7	9.40	2.865	Mar. 22	0555	407	11.5	8.01	2.441
Nov. 27	unknown	*940	26.6	10.07	3.069	aApr. 29	unknown	781	22.1	9.59	2.923
aFeb. 23	1110	40	1.13	5.58	1.701	aJune 1	1115	790	22.4	9.62	2.932
Mar. 4	2220	768	21.7	9.54	2.908	June 5	0445	453	12.8	8.23	2.509
aMar. 15	1030	451	12.8	8.22	2.505	aJuly 5	1015	359	10.2	7.77	2.368

a Water-quality samples were made on this date.

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical, biochemical, and pesticide analyses: November 1968 to September 1979 (discontinued). Sediment analyses: September 1970 to September 1973. Water temperatures: November 1968 to September 1979 (discontinued). Bacteria analyses: December 1975 to September 1979 (discontinued).

WATER QUALITY DATA, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979

DATE	TIME	STREAMFLOW, INSTANTANEOUS (CFS)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)	TEMPERATURE (DEG C)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (NTU)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)	OXYGEN DEMAND, BIOCHEMICAL, 5 DAY (MG/L)
FEB 23...	1120	38	817	7.9	18.5	80	140	8.2	90	>8.0
MAR 15...	1119	154	165	7.6	11.5	180	680	10.1	94	7.8
JUN 01...	1053	577	112	8.3	22.0	40	200	9.0	104	8.3
JUL 05...	1007	231	87	8.3	23.5	40	190	8.0	96	8.7

DATE	COLIFORM, TOTAL, IMMED. (COLS. PER 100 ML)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML)	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARDNESS (MG/L AS CACO3)	HARDNESS, NONCARBONATE (MG/L CACO3)	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	SODIUM ADSORPTION RATIO	POTASSIUM, DISSOLVED (MG/L AS K)
FEB 23...	210000	38000	40000	280	80	96	9.1	84	2.2	3.2
MAR 15...	46000	K26000	160000	49	8	18	.9	3.3	.2	2.9
JUN 01...	570000	92000	110000	36	6	13	.8	5.0	.4	2.0
JUL 05...	260000	220000	72000	33	5	12	.7	4.7	.4	2.1

DATE	BICARBONATE (MG/L AS HCO3)	CARBONATE (MG/L AS CO3)	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	SOLIDS, RESIDUE AT 105 DEG. C, SUSPENDED (MG/L)	SOLIDS, VOLATILE, SUSPENDED (MG/L)
FEB 23...	240	0	120	99	.7	10	540	280	50
MAR 15...	50	0	16	3.3	.1	3.4	73	878	168
JUN 01...	36	0	12	7.5	.1	2.2	60	542	190
JUL 05...	34	0	11	3.9	.1	1.9	53	378	38

08178300 ALAZAN CREEK AT ST. CLOUD STREET, SAN ANTONIO, TX--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979

DATE	NITROGEN, NITRATE TOTAL (MG/L AS N)	NITROGEN, NITRITE TOTAL (MG/L AS N)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N)	NITROGEN, AMMONIA TOTAL (MG/L AS N)	NITROGEN, ORGANIC TOTAL (MG/L AS N)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N)	PHOSPHORUS, TOTAL (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)	METHYLENE BLUE ACTIVE SUBSTANCE (MG/L)
FEB 23...	.26	.04	.30	.02	1.1	1.1	.22	24	.00
MAR 15...	.88	.06	.94	.29	1.0	1.3	.61	17	.00
JUN 01...	.27	.06	.33	.06	1.6	1.7	.34	24	.10
JUL 05...	.23	.06	.29	.03	.78	.81	.30	18	.10

DATE	TIME	ARSENIC DISSOLVED (UG/L AS AS)	BARIUM, DISSOLVED (UG/L AS BA)	CADMIUM DISSOLVED (UG/L AS CD)	CHROMIUM, DISSOLVED (UG/L AS CR)	COPPER, DISSOLVED (UG/L AS CU)	IRON, DISSOLVED (UG/L AS FE)
FEB 23...	1120	1	0	0	0	0	50
MAR 15...	1119	1	0	0	0	1	70
JUN 01...	1053	1	10	<1	10	3	50

DATE	LEAD, DISSOLVED (UG/L AS PB)	MANGANESE, DISSOLVED (UG/L AS MN)	MERCURY DISSOLVED (UG/L AS HG)	SELENIUM, DISSOLVED (UG/L AS SE)	SILVER, DISSOLVED (UG/L AS AG)	ZINC, DISSOLVED (UG/L AS ZN)
FEB 23...	3	60	.1	1	0	30
MAR 15...	0	30	.1	0	0	20
JUN 01...	21	10	.1	0	0	<3

DATE	TIME	PCB, TOTAL (UG/L)	NAPHTHALENES, POLYCHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)	CHLORDANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DIAZINON, TOTAL (UG/L)
FEB 23...	1120	.0	--	.00	.1	.03	.01	.03	.08
MAR 15...	1119	.0	--	.00	.2	.02	.01	.02	.11
JUN 01...	1053	.0	.00	.00	.1	.00	.00	.00	.40

DATE	DIELDRIN TOTAL (UG/L)	ENDOSULFAN, TOTAL (UG/L)	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTACHLOR, TOTAL (UG/L)	HEPTACHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALATHION, TOTAL (UG/L)	METHYL PARATHION, TOTAL (UG/L)
FEB 23...	.00	.00	.00	.00	.00	.00	.00	.02	.00
MAR 15...	.02	.00	.00	.00	.01	.00	.00	.00	.00
JUN 01...	.03	.00	.00	.00	.00	.00	.00	.00	.00

DATE	METHYL TRITHION, TOTAL (UG/L)	MIREX, TOTAL (UG/L)	PARATHION, TOTAL (UG/L)	TOXAPHENE, TOTAL (UG/L)	TOTAL TRITHION (UG/L)	2,4-D, TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)	SILVEX, TOTAL (UG/L)
FEB 23...	.00	.00	.00	0	.00	.19	.02	.00
MAR 15...	.00	.00	.00	0	.00	.15	.15	.00
JUN 01...	.00	.00	.00	0	.00	.03	.05	.00

GUADALUPE RIVER BASIN

08178555 HARLANDALE CREEK AT WEST HARDING BOULEVARD, SAN ANTONIO, TX

LOCATION.--Lat 29°21'05", long 98°29'32", Bexar County, Hydrologic Unit 12100301, at mid-channel, 71 ft (22 m) upstream from West Harding Boulevard, and 1.3 mi (2.1 km) upstream from Sixmile Creek.

DRAINAGE AREA.--2.43 mi² (6.29 km²).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1977 to current year.

GAGE.--Digital recorders (stage and rainfall) and crest-stage gages. Gage is not referenced to National Geodetic Vertical Datum of 1929.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 365 ft³/s (10.3 m³/s) June 1, 1979, elevation, 13.21 ft (4.026 m).

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 200 ft³/s (5.66 m³/s) and maximum (*):

Date	Time	Discharge (ft³/s)	Discharge (m³/s)	Elevation (ft)	Elevation (m)	Date	Time	Discharge (ft³/s)	Discharge (m³/s)	Elevation (ft)	Elevation (m)
aMar. 15	1150	0.37	0.010	10.41	3.173	June 1	1215	*365	10.3	13.21	4.026
aApr. 20	2355	201	5.69	12.29	3.746	June 5	0750	236	6.68	12.48	3.804
aApr. 29	1015	16	.45	10.86	3.310	aJuly 5	1235	175	4.96	12.13	3.697

a Water-quality samples were made on this date.

Minimum discharge, no flow most of time.

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical, biochemical, and pesticide analyses: October 1977 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH (UNITS)	TEMPER-ATURE (DEG C)	COLOR (PLAT-INUM-COBALT UNITS)	TUR-BID-ITY (NTU)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)	OXYGEN DEMAND, BIO-CHEM-ICAL, 5 DAY (MG/L)
MAR										
15...	1150	.40	293	7.7	13.0	60	680	5.2	50	16
APR										
21...	0130	82	110	8.4	20.0	60	110	7.8	87	13
29...	1015	16	135	---	21.0	50	120	7.8	91	19
JUN										
01...	1131	275	82	8.3	22.5	50	270	8.4	98	7.1
JUL										
05...	1253	163	126	8.0	26.0	70	60	6.0	75	11

DATE	COLI-FORM, TOTAL, IMMED. (COLS. PER 100 ML)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)
MAR										
15...	100000	K24000	K22000	130	24	48	2.5	9.9	.4	4.3
APR										
21...	680000	130000	460000	40	3	15	.7	1.1	.1	3.3
29...	220000	K22000	50000	46	1	17	.8	3.1	.2	3.7
JUN										
01...	820000	K130000	K100000	31	31	12	.3	1.9	.1	2.2
JUL										
05...	1000000	K320000	K180000	41	13	15	.8	6.3	.4	4.3

DATE	BICAR-BONATE (MG/L AS HCO3)	CAR-BONATE (MG/L AS CO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	SOLIDS, RESIDUE AT 105 DEG. C, SUS-PENDED (MG/L)	SOLIDS, VOLA-TILE, SUS-PENDED (MG/L)
MAR									
15...	130	0	34	11	.2	6.3	180	984	288
APR									
21...	46	0	8.1	2.3	.1	3.7	57	788	118
29...	54	0	10	3.9	.1	2.5	68	339	100
JUN									
01...	--	--	5.6	2.1	.1	2.4	27	466	146
JUL									
05...	34	0	11	11	.1	1.6	67	148	23

GUADALUPE RIVER BASIN

08178640 WEST ELM CREEK AT SAN ANTONIO, TX
(Flood-hydrograph partial-record station)

LOCATION.--Lat 29°37'23", long 98°26'29", Bexar County, Hydrologic Unit 12100301, at mid-channel, 1.8 mi (2.9 km) upstream from East Elm Creek, 2.1 mi (3.4 km) upstream from Farm Road 1604, and 7.0 mi (11.3 km) north of San Antonio International Airport.

DRAINAGE AREA.--2.45 mi^2 (6.35 km^2).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--February 1976 to current year.

GAGE.--Digital recorders (stage and rainfall) and crest-stage gages. Gage is not referenced to National Geodetic Vertical Datum 1929.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 335 ft^3/s (9.49 m^3/s) Sept. 28 1976, elevation, 4.30 ft (1.311 m).

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 100 ft^3/s (2.83 m^3/s) and maximum (*):

Date	Time	Discharge (ft^3/s)	Discharge (m^3/s)	Elevation (ft)	Elevation (m)
aJan. 10	1920	108	3.06	3.59	1.094
aMar. 21	0305	*156	4.42	3.80	1.158
aJune 1	1220	154	4.36	3.79	1.155

a Water-quality samples were made on this date.

Minimum discharge, no flow most of time.

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical, biochemical, pesticide, and bacteria analyses: May 1976 to current year. Water temperatures: May 1976 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH (UNITS)	TEMPER-ATURE (DEG C)	COLOR (PLAT-INUM-COBALT UNITS)	TUR-BID-ITY (NTU)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)	OXYGEN DEMAND, BIO-CHEM-ICAL, 5 DAY (MG/L)
MAR										
21...	0635	1.2	166	8.0	16.0	180	40	12.6	130	2.9
JUN										
01...	1106	12	84	8.6	20.5	250	600	8.2	93	3.0
01...	1331	32	122	8.1	20.5	50	15	7.2	81	2.6

DATE	COLI-FORM, TOTAL, IMMED. (COLS. PER 100 ML)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)
MAR										
21...	96000	48000	190000	77	1	29	1.0	1.5	.1	3.2
JUN										
01...	390000	20000	29000	39	6	15	.3	.6	.0	2.4
01...	370000	K26000	K34000	53	2	20	.7	1.2	.1	2.9

DATE	BICAR-BONATE (MG/L AS HCO3)	CAR-BONATE (MG/L AS CO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	SOLIDS, RESIDUE AT 105 DEG. C, SUS-PENDED (MG/L)	SOLIDS, VOLA-TILE, SUS-PENDED (MG/L)
MAR									
21...	92	0	6.9	3.0	.0	11	101	61	22
JUN									
01...	40	0	7.6	1.7	.1	9.5	57	632	272
01...	62	0	3.0	3.7	.0	9.3	71	24	12

DATE	NITRO-GEN, NITRATE TOTAL (MG/L AS N)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS-PHORUS, TOTAL (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)	METHY-LENE BLUE ACTIVE SUB-STANCE (MG/L)
MAR									
21...	.04	.02	.06	.03	.70	.73	.04	14	.00
JUN									
01...	.45	.12	.57	.11	2.6	2.7	.19	30	.00
01...	.65	.08	.73	.05	.89	.94	.09	13	.10

GUADALUPE RIVER BASIN

08178640 WEST ELM CREEK AT SAN ANTONIO, TX--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979

DATE	TIME	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, DIS-SOLVED (UG/L AS FE)
MAR 21...	0635	0	10	<1	0	9	40

DATE	LEAD, DIS-SOLVED (UG/L AS PB)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MERCURY DIS-SOLVED (UG/L AS HG)	NICKEL, DIS-SOLVED (UG/L AS NI)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	ZINC, DIS-SOLVED (UG/L AS ZN)
MAR 21...	0	2	.0	0	0	0	8

DATE	TIME	PCB, TOTAL (UG/L)	NAPH-THA-LENES, POLY-CHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)	CHLOR-DANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DI-AZINON, TOTAL (UG/L)
MAR 21...	0635	.0	--	.00	.0	.00	.02	.02	.00
JUN 01...	1106	.0	.00	.00	.0	.00	.00	.00	.00
01...	1331	.0	.00	.00	.0	.00	.00	.00	.00

DATE	DI-ELDRIN TOTAL (UG/L)	ENDO-SULFAN, TOTAL (UG/L)	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTA-CHLOR, TOTAL (UG/L)	HEPTA-CHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALA-THION, TOTAL (UG/L)	METHYL PARA-THION, TOTAL (UG/L)
MAR 21...	.00	.00	.00	.00	.00	.00	.01	.00	.00
JUN 01...	.00	.00	.00	.00	.00	.00	.00	.00	.00
01...	.00	.00	.00	.00	.00	.00	.00	.00	.00

DATE	METHYL TRI-THION, TOTAL (UG/L)	MIREX, TOTAL (UG/L)	PARA-THION, TOTAL (UG/L)	TOX-APHENE, TOTAL (UG/L)	TOTAL TRI-THION (UG/L)	2,4-D, TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)	SILVEX, TOTAL (UG/L)
MAR 21...	.00	.00	.00	0	.00	.00	.00	.00
JUN 01...	.00	.00	.00	0	.00	.00	.01	.00
01...	.00	.00	.00	0	.00	.00	.00	.00

GUADALUPE RIVER BASIN

08178645 E[illegible] ELM CREEK AT SAN ANTONIO, TX
(Flood-hydrograph partial-record station)

LOCATION.--Lat 29°37'04", long 98°25'41", Bexar County, Hydrologic Unit 12100301, at mid-channel, 2.1 mi (3.4 km) upstream from West Elm Creek, 2.4 mi (3.9 km) upstream from Farm Road 1604, and 6.9 mi (11.1 km) north of San Antonio International Airport.

DRAINAGE AREA.--2.33 mi^2 (6.03 km^2).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--November 1975 to current year.

GAGE.--Digital recorders (stage and rainfall) and crest-stage gages. Gage is not referenced to National Geodetic Vertical Datum of 1929.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 310 ft^3/s (8.78 m^3/s) May 7, 1976, elevation, 6.78 ft (2.067 m).

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 100 ft^3/s (2.83 m^3/s) and maximum (*):

Date	Time	Discharge (ft^3/s)	Discharge (m^3/s)	Elevation (ft)	Elevation (m)
Jan. 10	0940	*101	2.86	4.88	1.487
aMar. 21	0315	90	2.55	4.76	1.451
aJune 1	1050	71	2.01	4.55	1.387

a Water-quality samples were made on this date.

Minimum discharge, no flow most of time.

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical, biochemical, pesticide, and bacteria analyses: May 1976 to current year. Water temperatures: May 1976 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979

DATE	TIME	STREAMFLOW, INSTANTANEOUS (CFS)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)	TEMPERATURE (DEG C)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (NTU)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)	OXYGEN DEMAND, BIOCHEMICAL, 5 DAY (MG/L)
MAR 21...	0830	8.0	138	8.2	17.0	200	25	13.0	136	2.3
JUN 01...	1200	69	75	7.9	20.0	100	2.9	7.1	79	3.9
01...	1417	47	90	7.9	20.5	50	3.9	7.0	79	3.0

DATE	COLIFORM, TOTAL, IMMED. (COLS. PER 100 ML)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML)	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARDNESS (MG/L AS CACO3)	HARDNESS, NONCARBONATE (MG/L CACO3)	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	SODIUM ADSORPTION RATIO	POTASSIUM, DISSOLVED (MG/L AS K)
MAR 21...	43000	4000	28000	59	0	22	1.0	1.2	.1	3.2
JUN 01...	430000	K18000	33000	30	4	11	.6	.6	.0	4.4
01...	440000	K19000	32000	38	5	14	.7	1.2	.1	4.1

DATE	BICARBONATE (MG/L AS HCO3)	CARBONATE (MG/L AS CO3)	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	SOLIDS, RESIDUE AT 105 DEG. C, SUSPENDED (MG/L)	SOLIDS, VOLATILE, SUSPENDED (MG/L)
MAR 21...	73	0	5.9	2.1	.0	15	87	30	14
JUN 01...	32	0	7.6	1.7	.0	13	55	13	11
01...	40	0	7.1	1.7	.1	14	63	6	6

DATE	NITROGEN, NITRATE TOTAL (MG/L AS N)	NITROGEN, NITRITE TOTAL (MG/L AS N)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N)	NITROGEN, AMMONIA TOTAL (MG/L AS N)	NITROGEN, ORGANIC TOTAL (MG/L AS N)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N)	PHOSPHORUS, TOTAL (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)	METHYLENE BLUE ACTIVE SUBSTANCE (MG/L)
MAR 21...	.03	.02	.05	.06	.74	.80	.02	9.6	.00
JUN 01...	.70	.10	.80	.11	.89	1.0	.06	13	.00
01...	.47	.08	.55	.04	.92	.96	.08	13	.00

08178643 EAST ELM CREEK AT SAN ANTONIO, TX--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979

DATE	TIME	ARSENIC DIS- SOLVED (UG/L AS AS)	BARIUM, DIS- SOLVED (UG/L AS BA)	CADMIUM DIS- SOLVED (UG/L AS CD)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR)	COPPER, DIS- SOLVED (UG/L AS CU)	IRON, DIS- SOLVED (UG/L AS FE)
MAR 21...	0830	0	8	<1	0	25	70

DATE	LEAD, DIS- SOLVED (UG/L AS PB)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)	MERCURY DIS- SOLVED (UG/L AS HG)	NICKEL, DIS- SOLVED (UG/L AS NI)	SELE- NIUM, DIS- SOLVED (UG/L AS SE)	SILVER, DIS- SOLVED (UG/L AS AG)	ZINC, DIS- SOLVED (UG/L AS ZN)
MAR 21...	0	2	.0	0	0	0	30

DATE	TIME	PCB, TOTAL (UG/L)	NAPH- THA- LENES, POLY- CHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)	CHLOR- DANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DI- AZINON, TOTAL (UG/L)
MAR 21...	0830	.0	--	.00	.0	.00	.00	.00	.00
JUN 01...	1200	.0	.00	.00	.0	.00	.00	.00	.00
01...	1417	.0	.00	.00	.0	.00	.00	.00	.00

DATE	DI- ELDRIN TOTAL (UG/L)	ENDO- SULFAN, TOTAL (UG/L)	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTA- CHLOR, TOTAL (UG/L)	HEPTA- CHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALA- THION, TOTAL (UG/L)	METHYL PARA- THION, TOTAL (UG/L)
MAR 21...	.00	.00	.00	.00	.00	.00	.00	.00	.00
JUN 01...	.00	.00	.00	.00	.00	.00	.00	.00	.00
01...	.00	.00	.00	.00	.00	.00	.00	.00	.00

DATE	METHYL TRI- THION, TOTAL (UG/L)	MIREX, TOTAL (UG/L)	PARA- THION, TOTAL (UG/L)	TOX- APHENE, TOTAL (UG/L)	TOTAL TRI- THION (UG/L)	2,4-D, TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)	SILVEX, TOTAL (UG/L)
MAR 21...	.00	.00	.00	0	.00	.00	.00	.00
JUN 01...	.00	.00	.00	0	.00	.00	.02	.00
01...	.00	.00	.00	0	.00	.00	.01	.00

08178690 SALADO CREEK TRIBUTARY AT BITTERS ROAD, SAN ANTONIO, TX
(Flood-hydrograph partial-record station)

LOCATION.--Lat 29°31'36", long 98°26'25", Bexar County, Hydrologic Unit 12100301, at culvert on Bitters Road immediately east of MacArthur High School in San Antonio.

DRAINAGE AREA.--0.26 mi^2 (0.67 km^2).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1968 to current year.

GAGE.--Digital recorders (stage and rainfall). Gage is not referenced to National Geodetic Vertical Datum of 1929.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 253 ft^3/s (7.16 m^3/s) May 7, 1972, elevation, 7.88 ft (2.402 m).

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 50 ft^3/s (1.42 m^3/s) and maximum (*):

Date	Time	Discharge		Elevation		Date	Time	Discharge		Elevation	
		(ft^3/s)	(m^3/s)	(ft)	(m)			(ft^3/s)	(m^3/s)	(ft)	(m)
Nov. 26	0745	*190	5.38	6.73	2.051	May 11	1230	79	2.24	4.58	1.396
aMar. 15	1040	68	1.93	4.37	1.332	aJune 1	1035	139	3.94	5.78	1.762
Apr. 17	0610	55	1.56	4.08	1.244	aJuly 5	0905	55	1.56	4.09	1.247
Apr. 20	2245	112	3.17	5.24	1.597	July 10	1710	62	1.76	4.23	1.289
Apr. 29	0725	81	2.29	4.62	1.408	July 27	1145	109	3.09	5.18	1.579

a Water-quality samples were made on this day.

Minimum discharge, no flow most of time.

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical, biochemical, and pesticide analyses: November 1968 to current year. Sediment analyses: April to September 1973. Water temperatures: November 1968 to current year. Bacteria analyses: April 1976 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979

DATE	TIME	STREAM-FLOW, INSTANTANEOUS (CFS)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)	TEMPERATURE (DEG C)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (NTU)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)	OXYGEN DEMAND, BIOCHEMICAL, 5 DAY (MG/L)
MAR 15...	1150	16	108	7.9	11.5	70	20	9.6	101	5.7
JUN 01...	1035	139	63	8.6	--	60	84	--	--	4.9
JUL 05...	1130	17	77	7.4	26.0	40	6.8	6.7	83	4.7

DATE	COLIFORM, TOTAL, IMMED. (COLS. PER 100 ML)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML)	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARDNESS (MG/L AS CACO3)	HARDNESS, NONCARBONATE (MG/L CACO3)	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	SODIUM ADSORPTION RATIO	POTASSIUM, DISSOLVED (MG/L AS K)
MAR 15...	48000	7800	62000	36	11	13	.8	1.0	.1	3.6
JUN 01...	K730000	90000	120000	27	0	10	.4	1.0	.1	2.1
JUL 05...	K1200000	K1200000	46000	34	3	13	.3	1.1	.1	2.7

DATE	BICARBONATE (MG/L AS HCO3)	CARBONATE (MG/L AS CO3)	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	SOLIDS, RESIDUE AT 105 DEG. C, SUSPENDED (MG/L)	SOLIDS, VOLATILE, SUSPENDED (MG/L)
MAR 15...	30	0	14	2.0	.1	1.9	51	29	20
JUN 01...	32	0	2.5	1.5	.1	1.2	35	308	62
JUL 05...	38	0	9.7	1.6	.1	2.1	49	9	3

DATE	NITROGEN, NITRATE TOTAL (MG/L AS N)	NITROGEN, NITRITE TOTAL (MG/L AS N)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N)	NITROGEN, AMMONIA TOTAL (MG/L AS N)	NITROGEN, ORGANIC TOTAL (MG/L AS N)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N)	PHOSPHORUS, TOTAL (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)	METHYLENE BLUE ACTIVE SUBSTANCE (MG/L)
MAR 15...	1.2	.12	1.3	.30	.44	.94	.44	7.8	.10
JUN 01...	.25	.04	.29	.11	1.1	1.2	.36	17	.00
JUL 05...	.18	.10	.28	.01	.61	.62	.27	--	.10

GUADALUPE RIVER BASIN

08178690 SALADO CREEK TRIBUTARY AT BITTERS ROAD, SAN ANTONIO, TX--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979

DATE	TIME	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, DIS-SOLVED (UG/L AS FE)
MAR 15...	1150	1	0	0	0	0	10
JUN 01...	1035	1	0	0	0	11	300

DATE	LEAD, DIS-SOLVED (UG/L AS PB)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MERCURY DIS-SOLVED (UG/L AS HG)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	ZINC, DIS-SOLVED (UG/L AS ZN)
MAR 15...	9	10	.0	1	0	20
JUN 01...	27	10	.1	0	0	30

DATE	TIME	PCB, TOTAL (UG/L)	NAPH-THA-LENES, POLY-CHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)	CHLOR-DANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DI-AZINON, TOTAL (UG/L)
MAR 15...	1150	.0	--	.00	.1	.00	.00	.00	.46
JUN 01...	1035	.0	.00	.00	.4	.00	.00	.03	1.6
JUL 05...	1130	.2	.00	.00	.0	.00	.00	.00	1.7

DATE	DI-ELDRIN TOTAL (UG/L)	ENDO-SULFAN, TOTAL (UG/L)	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTA-CHLOR, TOTAL (UG/L)	HEPTA-CHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALA-THION, TOTAL (UG/L)	METHYL PARA-THION, TOTAL (UG/L)
MAR 15...	.01	.00	.00	.00	.01	.01	.01	.20	.00
JUN 01...	.00	.00	.00	.00	.00	.03	.00	.00	.00
JUL 05...	.00	.00	.00	.00	.00	.00	.00	.00	.00

DATE	METHYL TRI-THION, TOTAL (UG/L)	MIREX, TOTAL (UG/L)	PARA-THION, TOTAL (UG/L)	TOX-APHENE, TOTAL (UG/L)	TOTAL TRI-THION (UG/L)	2,4-D, TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)	SILVEX, TOTAL (UG/L)
MAR 15...	.00	.00	.00	0	.00	.04	.00	.01
JUN 01...	.00	.00	.00	0	.00	.01	.01	.00
JUL 05...	.00	.00	.00	0	.00	.02	.01	.00

GUADALUPE RIVER BASIN

08178700 SALADO CREEK (UPPER STATION) AT SAN ANTONIO, TX

LOCATION.--Lat 29°30'57", long 98°25'51", Bexar County, Hydrologic Unit 12100301, on upstream side of upstream bridge of two bridges on Interstate Highway 410 in San Antonio, 1.0 mi (1.6 km) west of Northeast School, 1.1 mi (1.8 km) upstream from Perrin-Beitel Creek, and 2.7 mi (4.3 km) east of San Antonio International Airport.

DRAINAGE AREA.--137 mi² (355 km²).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1960 to current year.

GAGE.--Water-stage recorder with concrete control. Datum of gage is 684.50 ft (208.666 m) National Geodetic Vertical Datum of 1929.

REMARKS.--Water-discharge records good. No known diversion above station. Recording rain gage located at station with four additional recording rain gages located in watershed. Flow is affected at times by discharge from flood-detention pools of seven floodwater-retarding structures with combined detention capacity of 17,390 acre-ft (21.4 hm³). These structures control runoff from 48.4 mi² (125.4 km²) above this station.

AVERAGE DISCHARGE.--19 years, 10.3 ft³/s (0.292 m³/s), 1.02 in/yr (26 mm/yr), 7,460 acre-ft/yr (9.20 hm³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 24,900 ft³/s (705 m³/s) May 12, 1972, gage height, 15.22 ft (4.639 m), from rating curve extended above 8,000 ft³/s (227 m³/s) on basis of slope-area measurement of peak flow; no flow at times.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1853, 23 to 24 ft (7.0 to 7.3 m) in October 1913. Flood in September 1921 reached a stage of 18 ft (5.5 m), and flood of Sept. 27, 1946, reached a stage of 18.2 ft (5.55 m), and are the highest since 1899.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 250 ft³/s (7.08 m³/s), revised, and maximum (*):

Date	Time	Discharge (ft³/s)	Discharge (m³/s)	Gage height (ft)	Gage height (m)	Date	Time	Discharge (ft³/s)	Discharge (m³/s)	Gage height (ft)	Gage height (m)
Nov. 26	0915	732	20.7	b6.58	2.006	aApr. 21	0330	*6,120	173	9.74	2.969
Jan. 11	0045	416	11.8	5.62	1.713	aApr. 29	1000	395	11.2	5.50	1.676
aMar. 15	1300	99	2.80	3.51	1.070	June 1	1215	1,980	56.1	7.80	2.377

a Water-quality samples were obtained on this date.
b From floodmark.

Minimum discharge, no flow Sept. 10, 11.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.6	.08	5.7	11	4.9	2.6	8.6	14	648	.13	2.5	2.0
2	4.6	.08	5.7	4.9	4.8	3.9	8.6	12	90	1.4	3.3	2.0
3	4.4	.08	5.7	.95	5.6	2.9	5.8	11	13	4.6	6.4	1.8
4	4.2	.07	5.4	.85	8.3	3.9	4.6	11	12	3.1	4.7	1.9
5	3.8	5.8	5.0	2.1	17	3.9	4.2	10	104	8.1	2.5	5.3
6	.67	6.2	4.9	5.1	22	4.2	4.2	10	37	7.9	2.5	5.8
7	.14	4.6	4.7	4.9	8.6	4.2	4.2	9.7	15	8.9	2.5	3.8
8	.14	4.2	3.9	4.3	6.1	3.1	4.2	9.6	14	11	5.1	.23
9	.18	3.6	.90	.87	5.3	.38	4.2	9.2	14	7.8	5.2	.03
10	.14	.20	.62	83	5.3	7.5	4.5	9.0	13	8.5	4.1	.00
11	.10	.11	.62	106	4.9	7.0	4.9	14	13	3.6	4.9	.00
12	.09	.11	.62	13	4.9	5.9	4.8	11	12	2.6	3.7	2.5
13	.51	.10	.62	10	4.9	5.0	4.7	8.7	12	2.3	2.4	3.6
14	4.1	.14	.62	8.1	5.0	1.4	4.2	8.3	11	5.0	1.9	5.3
15	4.2	3.1	.87	7.3	4.9	16	4.1	8.0	7.5	7.4	1.6	5.3
16	3.9	6.3	4.5	6.8	4.6	8.8	4.1	7.8	7.8	3.4	4.6	1.3
17	3.4	4.4	4.6	6.6	4.6	12	8.7	5.1	8.6	3.8	4.5	2.3
18	3.6	3.1	4.6	7.4	4.6	6.0	6.8	5.7	8.6	44	.79	1.2
19	2.1	.46	4.6	7.1	4.3	10	6.6	5.7	8.3	21	.34	.73
20	.16	.38	4.2	11	4.3	8.4	7.0	5.6	8.0	14	.43	1.6
21	.10	.22	.65	6.4	4.2	44	1210	5.7	8.0	6.8	3.3	1.4
22	.10	.17	.41	5.3	4.2	35	28	10	7.7	6.1	6.0	1.4
23	.10	.14	.41	5.3	4.4	9.6	16	2.4	7.4	5.9	8.1	1.4
24	.10	.11	.41	4.9	3.8	7.2	15	5.3	7.3	5.3	6.2	1.4
25	1.1	.10	.41	4.9	3.8	6.7	14	4.0	7.0	4.0	6.9	1.3
26	5.6	118	.33	4.9	3.5	6.8	13	4.0	6.7	18	1.3	1.3
27	4.6	8.8	1.3	5.7	1.8	7.8	13	4.6	6.0	45	.58	4.7
28	4.6	7.5	4.5	5.3	1.8	8.6	12	6.6	4.6	13	6.0	1.6
29	4.3	6.9	4.5	7.4	---	8.6	114	4.8	.39	6.4	6.4	1.5
30	2.8	6.6	4.6	6.6	---	9.1	21	4.6	.17	2.0	5.1	1.3
31	.12	---	8.3	5.3	---	8.6	---	5.2	---	.72	2.4	---
TOTAL	68.55	191.65	94.19	363.27	162.4	269.08	1565.0	242.6	1112.06	281.75	118.44	63.99
MEAN	2.21	6.39	3.04	11.7	5.80	8.68	52.2	7.83	37.1	9.09	3.82	2.13
MAX	5.6	118	8.3	106	22	44	1210	14	648	45	8.1	5.8
MIN	.09	.07	.33	.85	1.8	.38	4.1	2.4	.17	.13	.34	.00
CFSM	.02	.05	.02	.09	.04	.06	.38	.06	.27	.07	.03	.02
IN.	.02	.05	.03	.10	.04	.07	.42	.07	.30	.08	.03	.02
AC-FT	136	380	187	721	322	534	3100	481	2210	559	235	127
(††)	.35	7.07	.66	4.63	5.45	5.51	5.96	1.24	5.10	4.78	1.60	1.88

CAL YR 1978 TOTAL 6493.96 MEAN 17.8 MAX 4040 MIN .00 CFSM .13 IN 1.76 AC-FT 12880 †† 33.24
WTR YR 1979 TOTAL 4532.98 MEAN 12.4 MAX 1210 MIN .00 CFSM .09 IN 1.23 AC-FT 8990 †† 44.23

†† Weighted-mean rainfall, in inches, based on four rain gages.

08178700 SALADO CREEK (UPPER STATION) AT SAN ANTONIO, TX--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical, biochemical, and pesticide analyses: November 1968 to current year. Sediment analyses: November 1971 to September 1973. Water temperatures: November 1968 to current year. Bacteria analyses: May 1976 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH (UNITS)	TEMPER-ATURE (DEG C)	COLOR (PLAT-INUM-COBALT UNITS)	TUR-BID-ITY (NTU)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)	OXYGEN DEMAND, BIO-CHEM-ICAL, 5 DAY (MG/L)
MAR										
15...	1333	68	1130	8.1	15.5	7	50	9.8	100	2.2
APR										
21...	1758	168	271	8.8	--	--	140	7.8	90	3.2
29...	0900	190	844	10.2	20.5	25	72	7.8	92	3.8

DATE	COLI-FORM, TOTAL, IMMED. (COLS. PER 100 ML)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)
MAR										
15...	10000	K1300	5700	220	0	75	9.1	47	1.4	160
APR										
21...	100000	17000	74000	110	17	40	1.8	6.3	.3	8.3
29...	110000	4400	27000	280	23	100	7.0	33	.9	61

DATE	BICAR-BONATE (MG/L AS HCO3)	CAR-BONATE (MG/L AS CO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	SOLIDS, RESIDUE AT 105 DEG. C, SUS-PENDED (MG/L)	SOLIDS, VOLA-TILE, SUS-PENDED (MG/L)
MAR									
15...	290	0	240	36	.7	12	723	97	45
APR									
21...	110	0	25	7.2	.2	11	154	178	17
29...	312	0	140	25	.5	18	538	162	54

DATE	NITRO-GEN, NITRATE TOTAL (MG/L AS N)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS-PHORUS, TOTAL (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)	METHY-LENE BLUE ACTIVE SUB-STANCE (MG/L)
MAR									
15...	1.4	.02	1.4	.03	.40	.43	.01	5.5	.10
APR									
21...	.68	.08	.76	.10	.43	.53	.19	12	.10
29...	.70	.25	.95	.39	.51	.90	.11	9.6	.10

08178700 SALADO CREEK (UPPER STATION) AT SAN ANTONIO, TX--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979

DATE	TIME	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, DIS-SOLVED (UG/L AS FE)
MAR							
15...	1335	1	0	0	10	0	20
APR							
21...	1758	2	0	0	0	4	90
29...	0900	1	0	0	10	0	20

DATE	LEAD, DIS-SOLVED (UG/L AS PB)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MERCURY DIS-SOLVED (UG/L AS HG)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	ZINC, DIS-SOLVED (UG/L AS ZN)
MAR						
15...	0	10	.0	2	0	10
APR						
21...	1	10	.0	0	0	10
29...	0	20	.1	1	0	30

DATE	TIME	PCB, TOTAL (UG/L)	NAPH-THA-LENES, POLY-CHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)	CHLOR-DANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DI-AZINON, TOTAL (UG/L)	DI-ELDRIN TOTAL (UG/L)	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)
MAR												
15...	1335	.0	--	.00	.0	.00	.00	.00	.00	.00	.00	.00
APR												
21...	1758	.0	.00	.00	.0	.00	.00	.00	.28	.00	.00	.00
29...	0900	.0	.00	.00	.0	.00	.00	.00	.02	.00	.00	.00

DATE	HEPTA-CHLOR, TOTAL (UG/L)	HEPTA-CHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALA-THION, TOTAL (UG/L)	METHYL PARA-THION, TOTAL (UG/L)	METHYL TRI-THION, TOTAL (UG/L)	PARA-THION, TOTAL (UG/L)	TOX-APHENE, TOTAL (UG/L)	TOTAL TRI-THION (UG/L)	2,4-D, TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)	SILVEX, TOTAL (UG/L)
MAR												
15...	.00	.00	.00	.00	.00	.00	.00	0	.00	.01	.01	.00
APR												
21...	.00	.00	.00	.06	.00	.00	.00	0	.00	.04	.03	.00
29...	.00	.00	.00	.00	.00	.00	.00	0	.00	.01	.05	.00

08178800 SALADO CREEK (LOWER STATION) AT SAN ANTONIO, TX

LOCATION.--Lat 29°21'25", long 98°24'45", Bexar County, Hydrologic Unit 12100301, on right bank at upstream side of bridge on Loop 13 at San Antonio, 1.4 mi (2.3 km) east of Brooks Air Force Base, and 3.3 mi (5.3 km) upstream from Rosillo Creek.

DRAINAGE AREA.--189 mi² (490 km²).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1960 to current year.

GAGE.--Water-stage recorder. Datum of gage is 526.95 ft (160.614 m) National Geodetic Vertical Datum of 1929.

REMARKS.--Water-discharge records good. Small diversions above station. Recording rain gage located at station with six additional recording rain gages located in watershed. Most of low flow comes from artesian wells and springs in city of San Antonio. For statement regarding regulation by Soil Conservation Service floodwater-retarding structures, see station 08178700.

AVERAGE DISCHARGE.--19 years, 43.1 ft³/s (1.221 m³/s), 3.10 in/yr (79 mm/yr), 31,230 acre-ft/yr (38.5 hm³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,100 ft³/s (371 m³/s) Sept. 27, 1973, gage height, 28.83 ft (8.787 m); no flow Aug. 13, 1967.
Maximum stage since at least 1941, that of Sept. 27, 1973.

EXTREMES OUTSIDE PERIOD OF RECORD.--Floods of Sept. 27, 1946, and Aug. 15, 1960, were about equal magnitude. Flood of Aug. 15, 1960, reached a stage of 26.8 ft (8.17 m), from floodmarks.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 600 ft³/s (17.0 m³/s) and maximum (*):

Date	Time	Discharge (ft³/s)	Discharge (m³/s)	Gage height (ft)	Gage height (m)	Date	Time	Discharge (ft³/s)	Discharge (m³/s)	Gage height (ft)	Gage height (m)
Nov. 26	2200	909	25.7	12.68	3.865	aApr. 29	1900	1,240	35.1	13.80	4.206
aJan. 11	0500	1,120	31.7	13.43	4.093	June 1	2300	3,200	90.6	18.36	5.596
aApr. 21	1400	*3,290	93.2	18.53	5.648	June 5	1700	838	23.7	12.40	3.780

a Water-quality samples were obtained on this date.

Minimum discharge, 16 ft³/s (0.45 m³/s) Nov. 14, 15.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	28	20	30	147	38	30	51	75	1180	23	34	30
2	28	19	29	51	38	32	61	65	1050	22	34	29
3	28	18	28	33	46	123	71	62	96	21	38	28
4	27	19	28	28	54	42	47	58	54	23	36	27
5	27	43	28	32	122	36	42	57	475	219	35	28
6	26	175	27	32	211	35	38	55	262	88	33	42
7	25	33	27	33	84	35	35	54	72	43	30	35
8	23	24	28	30	48	34	35	52	54	39	29	30
9	25	22	25	27	43	33	34	51	49	41	30	27
10	25	20	24	158	40	42	34	52	46	37	32	25
11	23	17	22	644	37	52	34	73	44	49	31	23
12	23	17	22	87	36	38	30	103	43	35	126	22
13	23	17	22	54	37	37	28	56	42	33	60	22
14	23	16	24	46	36	37	27	50	41	34	36	23
15	23	24	23	43	35	45	28	48	38	55	33	24
16	23	50	23	42	33	100	29	48	34	37	31	28
17	23	43	24	42	33	95	62	47	34	27	32	27
18	23	24	26	43	33	62	64	43	33	90	30	35
19	24	23	26	53	32	52	60	43	32	95	28	42
20	23	26	25	60	33	76	85	42	32	102	27	29
21	22	22	25	49	33	136	1800	39	31	103	27	24
22	21	20	23	39	34	195	219	75	32	50	28	23
23	21	19	22	36	35	109	83	50	32	45	76	22
24	21	19	21	34	38	55	67	37	33	42	60	22
25	22	18	22	43	33	49	61	36	32	39	45	21
26	40	294	21	61	31	46	59	36	29	45	43	21
27	27	190	22	45	32	45	56	35	28	186	32	21
28	23	43	22	39	31	46	54	118	27	194	29	23
29	23	35	26	49	---	46	535	51	24	61	32	22
30	23	31	26	57	---	49	244	52	24	46	41	21
31	22	---	89	43	---	56	---	91	---	39	38	---
TOTAL	758	1341	830	2180	1336	1868	4073	1754	4003	1963	1216	796
MEAN	24.5	44.7	26.8	70.3	47.7	60.3	136	56.6	133	63.3	39.2	26.5
MAX	40	294	89	644	211	195	1800	118	1180	219	126	42
MIN	21	16	21	27	31	30	27	35	24	21	27	21
CFSM	.13	.24	.14	.37	.25	.32	.72	.30	.70	.34	.21	.14
IN.	.15	.26	.16	.43	.26	.37	.80	.35	.79	.39	.24	.16
AC-FT	1500	2660	1650	4320	2650	3710	8080	3480	7940	3890	2410	1580
(††)	.40	6.25	.77	4.21	4.32	4.80	5.75	1.32	5.23	5.16	1.66	1.60

CAL YR 1978 TOTAL 20810.6 MEAN 57.0 MAX 3670 MIN 9.6 CFSM .30 IN 4.10 AC-FT 41280 †† 34.10
WTR YR 1979 TOTAL 22118.0 MEAN 60.6 MAX 1800 MIN 16 CFSM .32 IN 4.35 AC-FT 43870 †† 41.47

†† Weighted-mean rainfall, in inches, based on seven rain gages.

GUADALUPE RIVER BASIN

08178800 SALADO CREEK (LOWER STATION) AT SAN ANTONIO, TX--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical, biochemical, and pesticide analyses: November 1968 to current year. Sediment analyses: November 1971 to September 1973. Water temperatures: November 1968 to current year. Bacteria analyses: December 1975 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979

DATE	TIME	STREAM-FLOW, INSTANTANEOUS (CFS)	SPECIFIC CONDUCTANCE (MICRO-MHOS)	PH (UNITS)	TEMPERATURE (DEG C)	COLOR (PLATINUM COBALT UNITS)	TURBIDITY (NTU)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)	OXYGEN DEMAND, BIOCHEMICAL, 5 DAY (MG/L)
JAN 11...	1400	519	297	7.7	6.5	100	380	11.1	93	4.9
APR 20...	0224	71	294	8.1	20.5	--	310	7.2	82	3.7
29...	1108	371	549	8.1	21.0	20	220	7.6	88	6.6

DATE	COLIFORM, TOTAL, IMMED. (COLS. PER 100 ML)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML)	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARDNESS (MG/L AS CACO3)	HARDNESS, NONCARBONATE (MG/L CACO3)	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	SODIUM ADSORPTION RATIO	POTASSIUM, DISSOLVED (MG/L AS K)
JAN 11...	110000	28000	150000	99	21	34	3.5	14	.6	5.7
APR 20...	E1200000	98000	260000	100	18	32	5.0	15	.7	6.3
29...	300000	36000	58000	200	43	65	10	31	.9	9.5

DATE	BICARBONATE (MG/L AS HCO3)	CARBONATE (MG/L AS CO3)	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	SOLIDS, RESIDUE AT 105 DEG. C, SUSPENDED (MG/L)	SOLIDS, VOLATILE, SUSPENDED (MG/L)
JAN 11...	96	0	34	16	.2	9.0	164	620	150
APR 20...	100	0	28	22	.2	7.0	165	1140	144
29...	196	0	66	35	.3	.0	323	950	106

DATE	NITROGEN, NITRATE TOTAL (MG/L AS N)	NITROGEN, NITRITE TOTAL (MG/L AS N)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N)	NITROGEN, AMMONIA TOTAL (MG/L AS N)	NITROGEN, ORGANIC TOTAL (MG/L AS N)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N)	PHOSPHORUS, TOTAL (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)	METHYLENE BLUE ACTIVE SUBSTANCE (MG/L)
JAN 11...	1.1	.04	1.1	.04	.58	.62	.470	16	.00
APR 20...	.67	.06	--	.29	2.4	--	.470	40	.10
29...	1.1	.10	1.2	.17	1.3	1.5	.280	66	.10

DATE	TIME	ARSENIC DISSOLVED (UG/L AS AS)	BARIUM, DISSOLVED (UG/L AS BA)	CADMIUM DISSOLVED (UG/L AS CD)	CHROMIUM, DISSOLVED (UG/L AS CR)	COPPER, DISSOLVED (UG/L AS CU)	IRON, DISSOLVED (UG/L AS FE)
JAN 11...	1400	2	30	<1	0	2	90
APR 20...	0224	2	0	0	0	3	160
29...	1108	1	0	0	0	0	10

DATE	LEAD, DISSOLVED (UG/L AS PB)	MANGANESE, DISSOLVED (UG/L AS MN)	MERCURY DISSOLVED (UG/L AS HG)	SELENIUM, DISSOLVED (UG/L AS SE)	SILVER, DISSOLVED (UG/L AS AG)	ZINC, DISSOLVED (UG/L AS ZN)
JAN 11...	3	6	.0	0	0	<3
APR 20...	2	20	.0	0	0	20
29...	0	20	.0	0	0	10

08178800 SALADO CREEK (LOWER STATION) AT SAN ANTONIO, TX--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979

DATE	TIME	PCB, TOTAL (UG/L)	NAPH- THA- LENES, POLY- CHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)	CHLOR- DANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DI- AZINON, TOTAL (UG/L)
JAN									
11...	1400	.0	--	.00	.1	.00	.00	.00	.09
APR									
20...	0224	.1	.00	.00	.0	.01	.00	.04	.30
29...	1108	.1	.00	.00	.0	.00	.00	.01	.30

DATE	DI- ELDRIN TOTAL (UG/L)	ENDO- SULFAN, TOTAL (UG/L)	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTA- CHLOR, TOTAL (UG/L)	HEPTA- CHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALA- THION, TOTAL (UG/L)	METHYL PARA- THION, TOTAL (UG/L)
JAN									
11...	.00	.00	.00	.00	.00	.01	.00	.04	.00
APR									
20...	.03	.00	.00	.00	.00	.00	.00	.00	.00
29...	.01	.00	.00	.00	.00	.00	.00	.00	.00

DATE	METHYL TRI- THION, TOTAL (UG/L)	MIREX, TOTAL (UG/L)	PARA- THION, TOTAL (UG/L)	TOX- APHENE, TOTAL (UG/L)	TOTAL TRI- THION (UG/L)	2,4-D, TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)	SILVEX, TOTAL (UG/L)
JAN								
11...	.00	.00	.00	0	.00	.11	.00	.03
APR								
20...	.00	.00	.00	0	.00	.01	.00	.00
29...	.00	.00	.00	0	.00	.03	.00	.00

GUADALUPE RIVER BASIN

08181000 LEON CREEK TRIBUTARY AT FARM ROAD 1604, SAN ANTONIO, TX
(Flood-hydrograph partial-record station)

LOCATION.--Lat 29°35'14", long 98°37'40", Bexar County, Hydrologic Unit 12100301, 97 ft (30 m) upstream from culvert on Farm Road 1604 at San Antonio and 1.5 mi (2.4 km) west of bridge on Leon Creek.

DRAINAGE AREA.--5.57 mi^2 (14.43 km^2).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July 1968 to current year.

GAGE.--Digital recorders (stage and rainfall) and crest-stage gages. Gage is not referenced to National Geodetic Vertical Datum of 1929.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,790 ft^3/s (50.7 m^3/s) July 16, 1973, elevation, 10.91 ft (3.325 m).

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 242 ft^3/s (6.85 m^3/s) Mar. 21, elevation, 4.07 ft (1.241 m); water-quality samples were made on Mar. 21 and Apr. 29.

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical, biochemical, and pesticide analyses: May 1970 to current year. Sediment analyses: May 1972 to June 1973. Water temperatures: May 1970 to current year. Bacteria analyses: April 1976 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979

DATE	TIME	STREAMFLOW, INSTANTANEOUS (CFS)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)	TEMPERATURE (DEG C)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (NTU)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)	OXYGEN DEMAND, BIOCHEMICAL, 5 DAY (MG/L)
MAR 21...	0310	198	174	8.2	16.5	240	180	13.2	138	3.0
APR 29...	1005	67	59	8.6	19.0	100	230	9.2	102	3.4

DATE	COLIFORM, TOTAL, IMMED. (COLS. PER 100 ML)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML)	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARDNESS (MG/L AS CACO3)	HARDNESS, NONCARBONATE (MG/L CACO3)	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	SODIUM ADSORPTION RATIO	POTASSIUM, DISSOLVED (MG/L AS K)
MAR 21...	K62000	37000	78000	81	12	30	1.4	1.3	.1	2.6
APR 29...	96000	K32000	K36000	45	9	17	.6	.9	.1	1.8

DATE	BICARBONATE (MG/L AS HCO3)	CARBONATE (MG/L AS CO3)	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	SOLIDS, RESIDUE AT 105 DEG. C, SUSPENDED (MG/L)	SOLIDS, VOLATILE, SUSPENDED (MG/L)
MAR 21...	84	0	12	2.4	.0	9.1	100	260	40
APR 29...	44	0	7.2	1.2	.1	5.3	56	304	70

DATE	NITROGEN, NITRATE TOTAL (MG/L AS N)	NITROGEN, NITRITE TOTAL (MG/L AS N)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N)	NITROGEN, AMMONIA TOTAL (MG/L AS N)	NITROGEN, ORGANIC TOTAL (MG/L AS N)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N)	PHOSPHORUS, TOTAL (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)	METHYLENE BLUE ACTIVE SUBSTANCE (MG/L)
MAR 21...	.39	.02	.41	.03	.84	.87	.07	19	.00
APR 29...	.36	.02	.38	.05	.94	.99	.07	12	.00

08181000 LEON CREEK TRIBUTARY AT FARM ROAD 1604, SAN ANTONIO, TX--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979

DATE	TIME	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, DIS-SOLVED (UG/L AS FE)
MAR 21...	0310	1	10	<1	0	3	40
APR 29...	1005	2	0	0	10	3	50

DATE	LEAD, DIS-SOLVED (UG/L AS PB)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MERCURY DIS-SOLVED (UG/L AS HG)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	ZINC, DIS-SOLVED (UG/L AS ZN)
MAR 21...	1	2	.0	0	0	<3
APR 29...	0	10	.0	0	0	10

DATE	TIME	PCB, TOTAL (UG/L)	NAPH-THA-LENES, POLY-CHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)	CHLOR-DANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DI-AZINON, TOTAL (UG/L)
MAR 21...	0310	.0	--	.00	.0	.00	.00	.00	.00
APR 29...	1005	.0	.00	.00	.0	.00	.00	.00	.02

DATE	DI-ELDRIN TOTAL (UG/L)	ENDO-SULFAN, TOTAL (UG/L)	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTA-CHLOR, TOTAL (UG/L)	HEPTA-CHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALA-THION, TOTAL (UG/L)	METHYL PARA-THION, TOTAL (UG/L)
MAR 21...	.00	.00	.00	.00	.00	.00	.00	.00	.00
APR 29...	.00	.00	.00	.00	.00	.00	.00	.00	.00

DATE	METHYL TRI-THION, TOTAL (UG/L)	MIREX, TOTAL (UG/L)	PARA-THION, TOTAL (UG/L)	TOX-APHENE, TOTAL (UG/L)	TOTAL TRI-THION (UG/L)	2,4-D, TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)	SILVEX, TOTAL (UG/L)
MAR 21...	.00	.00	.00	0	.00	.00	.00	.00
APR 29...	.00	.00	.00	0	.00	.00	.00	.00

GUADALUPE RIVER BASIN

08181400 HELOTES CREEK AT HELOTES, TX

LOCATION.--Lat 29°34'42", long 98°41'29", Bexar County, Hydrologic Unit 12100302, 42 ft (13 m) left of and 44 ft (13 m) downstream from centerline of bridge on State Highway 16, 0.1 mi (0.2 km) northwest of Helotes, and 8.6 mi (13.8 km) upstream from mouth.

DRAINAGE AREA.--15.0 mi^2 (38.8 km^2).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1968 to current year.

REVISED RECORDS.--WRD TX-73-1: 1972(M).

GAGE.--Water-stage recorder. Datum of gage is 1,014.82 ft (309.317 m) National Geodetic Vertical Datum of 1929.

REMARKS.--Water-discharge records good. An undetermined amount of flow is diverted for domestic use above the station, and some flow enters the Edwards and associated limestones through the Balcones Fault Zone in the vicinity of the gage. Recording rain gage located at station, with two additional recording rain gages located in watershed.

AVERAGE DISCHARGE.--11 years, 4.84 ft^3/s (0.137 m^3/s), 4.38 in/yr (111 mm/yr), 3,510 acre-ft/yr (4.33 hm^3/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,680 ft^3/s (217 m^3/s) July 16, 1973, gage height, 10.8 ft (3.29 m), from floodmarks, from rating curve extended above 5,000 ft^3/s (142 m^3/s); no flow most of time.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since 1923, 13.7 ft (4.18 m) in 1927, from information by local resident.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 140 ft^3/s (3.96 m^3/s) and maximum (*):

Date	Time	Discharge		Gage height		Date	Time	Discharge		Gage height	
		(ft^3/s)	(m^3/s)	(ft)	(m)			(ft^3/s)	(m^3/s)	(ft)	(m)
Nov. 5	2045	159	4.50	2.45	0.747	bMar. 22	0830	326	9.23	2.88	0.878
Nov. 26	0745	151	4.28	2.40	.732	June 1	1200	*592	16.8	a3.4	1.04
bMar. 21	0400	440	12.5	a3.10	.945	July 27	1430	440	12.5	3.10	.945

a From floodmark.
b Water-quality samples were obtained on this date.

Minimum discharge, no flow for many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	9.8	16	4.6	2.3	18	15	200	.27	3.4	.00
2	.00	.00	8.0	13	4.6	2.2	18	15	219	.00	3.2	.00
3	.00	.00	6.6	11	4.8	3.8	16	14	82	.07	2.5	.00
4	.00	.00	5.4	10	4.6	2.1	14	12	13	.00	2.0	.00
5	.00	24	4.2	9.0	5.9	1.1	14	11	22	.24	1.7	.00
6	.00	21	2.9	7.7	8.6	1.4	13	11	26	.41	1.5	.00
7	.00	10	2.1	7.2	9.4	1.0	12	11	21	.06	1.4	.00
8	.00	5.4	1.0	6.0	9.4	.60	12	10	16	.00	1.3	.00
9	.00	3.4	.34	5.2	9.1	.17	10	9.7	13	.00	1.0	.00
10	.00	1.9	.02	12	9.3	.81	11	9.1	12	.00	.54	.00
11	.00	.65	.00	25	9.1	.61	10	7.5	10	.00	3.2	.00
12	.00	.01	.07	26	8.4	.21	8.4	6.5	9.1	.00	2.2	.00
13	.00	.00	.00	22	7.4	.02	7.7	5.8	8.2	.00	1.0	.00
14	.00	.00	.00	17	6.9	.00	7.0	5.0	7.2	.00	.74	.00
15	.00	.00	.00	15	6.5	.04	6.1	3.9	6.7	.00	.61	.00
16	.00	.01	.00	13	6.0	.67	5.4	3.2	5.9	.00	.43	.00
17	.00	.00	.00	11	5.8	2.1	7.9	2.6	5.5	.00	.36	.00
18	.00	.00	.00	11	5.7	1.8	6.1	2.4	4.9	6.9	.42	.00
19	.00	.00	.00	10	5.8	.87	8.3	1.7	4.4	1.8	.09	.00
20	.00	.00	.00	9.6	5.7	.72	6.3	1.3	3.7	.31	.01	.00
21	.00	.00	.00	8.8	5.0	110	33	.98	3.5	.07	.00	.00
22	.00	.00	.00	8.6	4.6	131	33	2.6	3.1	.00	.00	.00
23	.00	.00	.00	8.0	4.3	93	26	1.2	2.5	.00	.00	.00
24	.00	.00	.00	7.0	3.6	65	22	.32	2.1	.00	.05	.00
25	.00	.00	.00	7.1	3.0	48	20	.06	1.8	.00	.00	.00
26	.00	32	.00	6.7	3.0	37	17	.00	1.7	.00	.00	.00
27	.00	23	.00	6.0	3.5	30	15	.00	1.2	44	.00	.00
28	.00	16	.00	5.2	2.9	25	14	.00	1.0	9.6	.00	.00
29	.00	13	.00	5.3	---	24	28	.00	.76	6.3	.00	.00
30	.00	11	.00	5.3	---	22	18	.00	.46	4.7	.00	.00
31	.00	---	21	4.8	---	18	---	.00	---	4.3	.00	---
TOTAL	.00	161.37	61.43	329.5	167.5	625.52	437.2	162.86	707.72	79.03	27.65	.00
MEAN	.000	5.38	1.98	10.6	5.98	20.2	14.6	5.25	23.6	2.55	.89	.000
MAX	.00	32	21	26	9.4	131	33	15	219	44	3.4	.00
MIN	.00	.00	.00	4.8	2.9	.00	5.4	.00	.46	.00	.00	.00
CFSM	.000	.36	.13	.71	.40	1.35	.97	.35	1.57	.17	.06	.000
IN.	.00	.40	.15	.82	.42	1.55	1.08	.40	1.76	.20	.07	.00
AC-FT	.00	320	122	654	332	1240	867	323	1400	157	55	.00
(††)	.26	7.27	.55	4.16	1.31	4.36	5.24	1.57	3.98	6.50	2.24	1.29

CAL YR 1978 TOTAL 358.60 MEAN .98 MAX 49 MIN .00 CFSM .07 IN .89 AC-FT 711 †† 31.86
WTR YR 1979 TOTAL 2759.78 MEAN 7.56 MAX 219 MIN .00 CFSM .50 IN 6.84 AC-FT 5470 †† 38.75

†† Weighted-mean rainfall, in inches, based on three rain gages.
NOTE.--No gage-height record May 11 to June 3.

GUADALUPE RIVER BASIN

08181400 HELOTES CREEK AT HELOTES, TX--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical, biochemical, and pesticide analyses: May 1969 to current year. Sediment analyses: May 1972 to September 1973. Water temperatures: May 1969 to current year. Bacteria analyses: April 1976 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH (UNITS)	TEMPER-ATURE (DEG C)	COLOR (PLAT-INUM-COBALT UNITS)	TUR-BID-ITY (NTU)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)	OXYGEN DEMAND, BIO-CHEM-ICAL, 5 DAY (MG/L)
MAR										
21...	0350	97	355	8.1	17.0	70	140	13.4	141	2.4
22...	0915	279	465	8.6	17.0	20	55	8.4	88	3.1
JUL										
18...	0841	33	337	7.9	25.5	15	22	7.0	86	--

DATE	COLI-FORM, TOTAL, IMMED. (COLS. PER 100 ML)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)
MAR										
21...	K65000	K15000	77000	170	18	54	9.4	5.6	.2	1.7
22...	K15000	3800	28000	220	10	73	10	5.5	.2	1.1
JUL										
18...	32000	14000	15000	150	3	44	10	8.0	.3	2.2

DATE	BICAR-BONATE (MG/L AS HCO3)	CAR-BONATE (MG/L AS CO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	SOLIDS, RESIDUE AT 105 DEG. C, SUS-PENDED (MG/L)	SOLIDS, VOLA-TILE, SUS-PENDED (MG/L)
MAR									
21...	190	0	14	9.1	.1	8.3	196	121	50
22...	260	0	14	9.2	.1	9.2	250	98	22
JUL									
18...	180	0	14	12	.1	11	190	43	21

DATE	NITRO-GEN, NITRATE TOTAL (MG/L AS N)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS-PHORUS, TOTAL (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)	METHY-LENE BLUE ACTIVE SUB-STANCE (MG/L)
MAR									
21...	.30	.02	.32	.02	.64	.66	.01	11	.00
22...	.58	.02	.60	.02	.42	.44	.05	5.8	.00
JUL									
18...	.25	.02	.27	.04	.49	.53	.03	6.8	.00

08181400 HELOTES CREEK AT HELOTES, TX--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979

DATE	TIME	ARSENIC DISSOLVED (UG/L AS AS)	BARIUM, DISSOLVED (UG/L AS BA)	CADMIUM DISSOLVED (UG/L AS CD)	CHROMIUM, DISSOLVED (UG/L AS CR)	COPPER, DISSOLVED (UG/L AS CU)
MAR						
21...	0350	1	20	<1	0	2
22...	0915	0	20	<1	0	2
JUL						
18...	0841	1	100	1	0	18

DATE	IRON, DISSOLVED (UG/L AS FE)	LEAD, DISSOLVED (UG/L AS PB)	MANGANESE, DISSOLVED (UG/L AS MN)	MERCURY DISSOLVED (UG/L AS HG)	SELENIUM, DISSOLVED (UG/L AS SE)	SILVER, DISSOLVED (UG/L AS AG)	ZINC, DISSOLVED (UG/L AS ZN)
MAR							
21...	20	0	1	.0	0	0	3
22...	0	0	2	.0	0	0	3
JUL							
18...	10	3	20	.1	0	0	10

DATE	TIME	PCB, TOTAL (UG/L)	NAPHTHALENES, POLYCHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)	CHLORDANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DIAZINON, TOTAL (UG/L)
MAR									
21...	0350	.0	--	.00	.0	.00	.00	.00	.00
22...	0915	.0	--	.00	.0	.00	.00	.00	.00
JUL									
18...	0841	.0	.00	.00	.0	.00	.00	.00	.03

DATE	DIELDRIN TOTAL (UG/L)	ENDOSULFAN, TOTAL (UG/L)	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTACHLOR, TOTAL (UG/L)	HEPTACHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALATHION, TOTAL (UG/L)	METHYL PARATHION, TOTAL (UG/L)
MAR									
21...	.00	.00	.00	.00	.00	.00	.00	.00	.00
22...	.00	.00	.00	.00	.00	.00	.00	.00	.00
JUL									
18...	.00	.00	.00	.00	.00	.00	.00	.00	.01

DATE	METHYL TRITHION, TOTAL (UG/L)	MIREX, TOTAL (UG/L)	PARATHION, TOTAL (UG/L)	TOXAPHENE, TOTAL (UG/L)	TOTAL TRITHION (UG/L)	2,4-D, TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)	SILVEX, TOTAL (UG/L)
MAR								
21...	.00	.00	.00	0	.00	.01	.00	.00
22...	.00	.00	.00	0	.00	.00	.00	.00
JUL								
18...	.00	.00	.00	0	.00	.01	.00	.00

GUADALUPE RIVER BASIN

08181450 LEON CREEK TRIBUTARY AT KELLY AIR FORCE BASE, TX

LOCATION.--Lat 29°23'12", long 98°36'00", Bexar County, Hydrologic Unit 12100302, on left bank 128 ft (39 m) downstream from centerline of bridge on Billy Mitchell Road at Kelly Air Force Base, 0.15 mi (0.24 km) upstream from mouth, and 2.0 mi (3.2 km) southeast of intersection of U.S. Highway 90 West and Loop 13.

DRAINAGE AREA.--1.19 mi² (3.08 km²).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1969 to September 1979 (discontinued).

GAGE.--Water-stage recorder and sharp-crested weir. Datum of gage is 657.57 ft (220.427 m) National Geodetic Vertical Datum of 1929.

REMARKS.--Water-discharge records fair. Recording rain gage located at station with an additional rain gage located in watershed.

AVERAGE DISCHARGE.--10 years, 0.53 ft³/s (0.0150 m³/s), 6.05 in/yr (154 mm/yr), 384 acre-ft/yr (473,000 m³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 555 ft³/s (15.7 m³/s) May 14, 1970, gage height, 4.44 ft (1.353 m), from rating curve extended above 300 ft³/s (8.50 m³/s) on basis of formula, $Q=CLH^{3/2}$; no flow at times each year.

EXTREMES OUTSIDE PERIOD OF RECORD.--No historical flood information is available.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 150 ft³/s (4.25 m³/s), and maximum (*):

Date	Time	Discharge (ft³/s)	Discharge (m³/s)	Gage height (ft)	Gage height (m)	Date	Time	Discharge (ft³/s)	Discharge (m³/s)	Gage height (ft)	Gage height (m)
aMar. 22	0830	22	0.62	1.60	0.488	June 1	1245	*228	6.46	2.89	0.881
aApr. 21	0100	116	3.29	2.28	.695	aJuly 5	1345	32	.91	1.73	.527

a Water-quality samples were obtained on this date.

Minimum discharge, no flow most of time.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	1.8	.00	.00	.00	.02	34	.02	.14	.00
2	.00	.00	.00	.00	.00	.00	.08	.02	.74	.02	.01	.00
3	.00	.00	.00	.00	.00	.48	.02	.02	.02	.02	.00	.00
4	.00	.00	.00	.00	.02	.00	.00	.02	.00	.02	.00	.00
5	.00	19	.00	.00	.50	.00	.00	.00	8.2	5.2	.00	.81
6	.00	.92	.00	.00	.42	.00	.00	.00	.02	.03	.00	.00
7	.00	.02	.00	.00	.02	.00	.00	.00	.02	.54	.00	.00
8	.00	.00	.00	.00	.02	.00	.00	.00	.02	1.0	.00	.00
9	.00	.00	.00	.00	.00	.00	.00	.00	.02	.61	.00	.00
10	.00	.00	.00	9.3	.00	.00	.00	.00	.02	.73	.00	.00
11	.00	.00	.00	.34	.00	.00	.00	1.8	.02	.11	.00	.00
12	.00	.00	.00	.02	.00	.00	.00	.02	.02	.09	1.5	.00
13	.00	.00	.00	.01	.00	.00	.00	.01	.02	.10	.01	.00
14	.00	.00	.00	.00	.00	.00	.00	.02	.02	.04	.00	.00
15	.00	.00	.00	.00	.00	.00	.00	.02	.02	.02	.60	.00
16	.00	.03	.00	.00	.00	.00	.00	.00	.02	.02	.02	.00
17	.00	.00	.00	.00	.00	.38	.61	.00	.02	.02	.01	.00
18	.00	.00	.00	.00	.00	.00	.01	.00	.02	2.8	.00	.00
19	.00	.00	.00	.00	.00	.00	6.3	.00	.02	.02	.00	.00
20	.00	.00	.00	.00	.00	.00	.13	.00	.02	.02	.00	.00
21	.00	.00	.00	.00	.00	.51	16	.00	.02	.02	.00	.00
22	.00	.00	.00	.00	.00	3.1	.02	1.1	.02	.07	.00	.00
23	.00	.00	.00	.00	.00	.22	.02	.00	.02	.01	.73	.00
24	.00	.00	.00	.00	.00	.18	.02	.02	.02	.00	.01	.00
25	.00	.00	.00	.00	.00	.05	.02	.00	.02	.00	.00	.00
26	.00	8.0	.00	.00	.00	.00	.02	.00	.02	4.4	.00	.00
27	.00	.00	.00	.00	.00	.00	.02	.00	.02	.79	.00	.00
28	.00	.00	.00	.00	.00	.00	.02	3.9	.02	1.4	.00	.00
29	.00	.00	.00	.00	---	.00	3.6	.03	.02	1.9	.51	.00
30	.00	.00	.00	.00	---	.00	.02	.26	.02	1.6	.02	.00
31	.00	---	.58	.00	---	.00	---	.02	---	.66	.00	---
TOTAL	.00	27.97	.58	11.47	.98	4.92	26.91	7.28	43.46	22.28	3.56	.81
MEAN	.000	.93	.019	.37	.035	.16	.90	.23	1.45	.72	.11	.027
MAX	.00	19	.58	9.3	.50	3.1	16	3.9	34	5.2	1.5	.81
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CFSM	.000	.78	.02	.31	.03	.13	.76	.19	1.22	.61	.09	.02
IN.	.00	.87	.02	.36	.03	.15	.84	.23	1.36	.70	.11	.03
AC-FT	.00	55	1.2	23	1.9	9.8	53	14	86	44	7.1	1.6
(††)	.27	5.01	.80	2.70	.97	2.00	4.77	1.73	5.58	3.88	2.49	.72

CAL YR 1978 TOTAL 159.78 MEAN .44 MAX 24 MIN .00 CFSM .37 IN 4.99 AC-FT 317 †† 29.17
WTR YR 1979 TOTAL 150.22 MEAN .41 MAX 34 MIN .00 CFSM .35 IN 4.69 AC-FT 298 †† 30.92

†† Weighted-mean rainfall, in inches, based on two rain gages.

GUADALUPE RIVER BASIN

08181450 LEON CREEK TRIBUTARY AT KELLY AIR FORCE BASE, TX--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical, biochemical, and pesticide analyses: December 1969 to current year. Sediment analyses: April 1972 to September 1973. Water temperatures: December 1969 to current year. Bacteria analyses: April 1976 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979

DATE	TIME	STREAMFLOW, INSTANTANEOUS (CFS)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)	TEMPERATURE (DEG C)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (NTU)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)	OXYGEN DEMAND, BIOCHEMICAL, 5 DAY (MG/L)
MAR 22...	1025	11	84	9.3	19.0	220	130	7.0	76	3.2
APR 21...	0027	.74	74	8.5	20.0	40	190	8.2	92	5.0
JUL 05...	1223	8.4	329	7.6	25.5	30	17	6.0	75	10

DATE	COLIFORM, TOTAL, IMMED. (COLS. PER 100 ML)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML)	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARDNESS (MG/L AS CACO3)	HARDNESS, NONCARBONATE (MG/L CACO3)	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	SODIUM ADSORPTION RATIO	POTASSIUM, DISSOLVED (MG/L AS K)
MAR 22...	K17000	K10000	44000	35	1	13	.7	1.4	.1	2.0
APR 21...	K180000	K8000	23000	25	2	9.5	.3	1.0	.1	1.9
JUL 05...	300000	K28000	K11000	160	160	60	3.0	17	.6	4.4

DATE	BICARBONATE (MG/L AS HCO3)	CARBONATE (MG/L AS CO3)	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	SOLIDS, RESIDUE AT 105 DEG. C, SUSPENDED (MG/L)	SOLIDS, VOLATILE, SUSPENDED (MG/L)
MAR 22...	42	0	4.2	1.7	.0	3.7	47	--	--
APR 21...	28	0	2.8	.8	.1	2.5	33	369	51
JUL 05...	--	--	32	10	.1	7.3	134	49	7

DATE	NITROGEN, NITRATE TOTAL (MG/L AS N)	NITROGEN, NITRITE TOTAL (MG/L AS N)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N)	NITROGEN, AMMONIA TOTAL (MG/L AS N)	NITROGEN, ORGANIC TOTAL (MG/L AS N)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N)	PHOSPHORUS, TOTAL (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)	METHYLENE BLUE ACTIVE SUBSTANCE (MG/L)
MAR 22...	.26	.02	.28	.04	.38	.42	.06	6.8	.10
APR 21...	.39	.02	.41	.13	.55	.68	.11	9.9	.10
JUL 05...	3.3	.27	3.6	.02	1.1	1.1	.11	13	.20

GUADALUPE RIVER BASIN

08181450 LEON CREEK TRIBUTARY AT KELLY AIR FORCE BASE TX--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979

DATE	TIME	ARSENIC DISSOLVED (UG/L AS AS)	BARIUM, DISSOLVED (UG/L AS BA)	CADMIUM DISSOLVED (UG/L AS CD)	CHROMIUM, DISSOLVED (UG/L AS CR)	COPPER, DISSOLVED (UG/L AS CU)
MAR 22...	1025	3	8	<1	0	4
APR 21...	0027	3	0	1	0	1

DATE	IRON, DISSOLVED (UG/L AS FE)	LEAD, DISSOLVED (UG/L AS PB)	MANGANESE, DISSOLVED (UG/L AS MN)	MERCURY DISSOLVED (UG/L AS HG)	SELENIUM, DISSOLVED (UG/L AS SE)	SILVER, DISSOLVED (UG/L AS AG)	ZINC, DISSOLVED (UG/L AS ZN)
MAR 22...	30	1	2	.0	0	0	7
APR 21...	10	0	10	.0	0	0	10

DATE	TIME	PCB, TOTAL (UG/L)	NAPHTHALENES, POLYCHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)	CHLORDANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DIAZINON, TOTAL (UG/L)
MAR 22...	1025	.2	--	.00	.0	.06	.01	.18	.00
APR 21...	0027	.6	.00	.00	.0	.00	.00	.30	.00

DATE	DIELDRIN TOTAL (UG/L)	ENDOSULFAN, TOTAL (UG/L)	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTACHLOR, TOTAL (UG/L)	HEPTACHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALATHION, TOTAL (UG/L)	METHYL PARATHION, TOTAL (UG/L)
MAR 22...	.00	.00	.00	.00	.00	.00	.00	.00	.00
APR 21...	.03	.00	.02	.00	.00	.00	.00	.00	.00

DATE	METHYL TRITHION, TOTAL (UG/L)	MIREX, TOTAL (UG/L)	PARATHION, TOTAL (UG/L)	TOXAPHENE, TOTAL (UG/L)	TOTAL TRITHION (UG/L)	2,4-D, TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)	SILVEX, TOTAL (UG/L)
MAR 22...	.00	.00	.00	0	.00	.00	.00	.00
APR 21...	.00	.00	.00	0	.00	.01	.00	.00

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY PERIOD :1979 WATER YEAR

DATE	GAGE NUMBER											
	1-S	3-S	4-S	5-S	1-ES	2-ES	3-ES	1-H	2-H	3-H	1-A	2-A
OCT												
4	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.20	0.20	0.25	0.00	0.28	0.32	0.36	0.20	0.28	0.15	0.19	0.18
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00
25	0.13	0.25	0.18	0.40	0.10	0.00	0.17	0.00	0.03	0.10	0.26	0.21
26	0.00	0.00	0.02	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MTOT	0.33	0.46	0.45	0.51	0.38	0.33	0.55	0.20	0.41	0.30	0.45	0.39
NOV												
5	3.97	1.72	1.56	1.50	2.35	1.04	2.07	4.89	4.35	4.21	3.85	3.33
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.45	0.02	0.00	0.00	0.00	0.00	0.00
15	1.15	0.55	0.44	0.40	0.80	0.58	0.87	0.14	0.51	0.00	0.64	0.73
16	0.20	0.44	0.30	0.29	0.30	0.15	0.35	0.69	0.19	0.70	0.20	0.23
17	0.00	0.00	0.00	0.03	0.00	0.00	0.01	0.17	0.00	0.00	0.00	0.00
18	0.61	0.00	0.00	0.00	0.40	0.00	0.00	0.08	0.25	0.20	0.27	0.31
19	0.14	0.26	0.22	0.27	0.10	0.15	0.36	0.11	0.07	0.00	0.00	0.00
20	0.07	0.08	0.10	0.10	0.00	0.04	0.08	0.00	0.00	0.00	0.00	0.00
21	0.00	0.01	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
22	0.04	0.02	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.10	0.06	0.00	0.00	0.12	0.06	0.11	0.04	0.10	0.02	0.06	0.08
25	0.15	0.01	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.05	0.00	0.00
26	1.31	1.92	1.27	1.13	1.08	1.17	1.26	1.14	1.87	1.64	1.08	1.25
27	0.06	0.04	0.00	0.00	0.00	0.00	0.39	0.00	0.00	0.00	0.00	0.01
28	0.00	0.02	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.08	0.00	0.01
29	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00
MTOT	7.80	5.13	3.89	3.72	5.15	3.65	5.61	7.30	7.34	6.90	6.10	5.95

MTOT=MONTHLY TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY PERIOD :1979 WATER YEAR

DATE	GAGE NUMBER											
	1-S	3-S	4-S	5-S	1-ES	2-ES	3-ES	1-H	2-H	3-H	1-A	2-A
DEC												
2	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.15	0.10	0.08	0.07	0.12	0.00	0.14	0.00	0.00	0.00	0.00	0.11
4	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.01
7	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
14	0.10	0.08	0.05	0.13	0.12	0.10	0.10	0.05	0.08	0.03	0.00	0.08
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
19	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.11	0.05	0.00	0.07	0.10	0.10	0.11	0.00	0.00	0.00	0.10	0.05
29	0.02	0.01	0.00	0.05	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.01
30	0.00	0.02	0.00	1.03	0.75	0.03	0.02	0.07	0.08	0.06	0.10	0.13
31	0.00	0.71	0.54	0.09	0.60	1.27	1.24	0.40	0.43	0.36	0.00	0.00
MTOT	0.38	0.98	0.67	1.45	1.69	1.53	1.67	0.54	0.59	0.45	0.20	0.44
CTOT	30.97	38.79	35.47	36.38	33.81	34.88	40.37	32.35	31.55	26.44	31.05	32.67

MTOT=MONTHLY TOTALS
CTOT=CALENDAR YEAR TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY — PERIOD :1979 WATER YEAR

DATE	GAGE NUMBER											
	1-S	3-S	4-S	5-S	1-ES	2-ES	3-ES	1-H	2-H	3-H	1-A	2-A
JAN												
1	0.15	0.27	0.30	0.00	0.10	0.34	0.27	1.10	1.21	0.98	0.85	0.41
2	1.11	0.00	0.05	0.00	0.00	0.04	0.00	0.33	0.35	0.28	0.25	0.04
3	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.12	0.40	0.00	0.00
4	0.28	0.14	0.00	0.00	0.00	0.00	0.25	0.04	0.08	0.00	0.19	0.18
5	0.10	0.05	0.05	0.00	0.25	0.00	0.06	0.00	0.03	0.00	0.05	0.06
6	0.07	0.03	0.05	0.00	0.08	0.14	0.07	0.04	0.05	0.00	0.04	0.02
10	1.92	1.88	1.78	1.70	2.00	1.98	1.96	1.36	1.48	1.22	1.31	1.47
11	0.20	0.04	0.00	0.00	0.00	0.04	0.05	0.16	0.25	0.06	0.14	0.15
12	0.00	0.01	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.00	0.02	0.02
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.01	0.00	0.01	0.02	0.00	0.03	0.00	0.00	0.00	0.04	0.03
18	0.33	0.14	0.20	0.24	0.20	0.20	0.21	0.33	0.39	0.28	0.42	0.28
19	0.04	0.18	0.10	0.15	0.05	0.18	0.24	0.04	0.00	0.05	0.15	0.10
20	0.00	0.03	0.02	0.03	0.03	0.03	0.05	0.00	0.00	0.00	0.06	0.04
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.08	0.00	0.00	0.00
25	0.32	0.36	0.28	0.30	0.30	0.35	0.41	0.20	0.23	0.20	0.56	0.36
26	0.00	0.01	0.04	0.00	0.00	0.02	0.03	0.00	0.00	0.04	0.04	0.03
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.02	0.03	0.04	0.00	0.01	0.02	0.03	0.04	0.05	0.02	0.00	0.08
29	0.23	0.29	0.22	0.23	0.28	0.28	0.31	0.16	0.18	0.15	0.13	0.23
30	0.05	0.01	0.02	0.00	0.00	0.03	0.06	0.00	0.00	0.00	0.00	0.03
MTOT	5.22	3.48	3.15	2.66	3.32	3.66	4.05	4.09	4.50	3.68	4.25	3.53
FEB												
2	0.10	0.05	0.04	0.00	0.09	0.10	0.11	0.04	0.07	0.00	0.00	0.06
3	0.24	0.17	0.13	0.00	0.22	0.19	0.23	0.27	0.24	0.30	0.15	0.15
4	0.43	0.34	0.30	0.24	0.35	0.42	0.42	0.28	0.32	0.25	0.31	0.33
5	0.58	0.28	0.25	0.41	0.36	0.33	0.33	0.33	0.34	0.30	0.27	0.27
6	0.32	0.41	0.36	0.32	0.38	0.25	0.32	0.14	0.18	0.10	0.40	0.20
7	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.01
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.10	0.04	0.00	0.00	0.00	0.00	0.07	0.05	0.10	0.00	0.00	0.05
21	0.07	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
22	0.30	0.01	0.00	0.00	0.05	0.03	0.04	0.05	0.07	0.02	0.00	0.03
23	0.00	0.13	0.08	0.09	0.38	0.27	0.28	0.00	0.15	0.10	0.10	0.10
28	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
MTOT	2.14	1.44	1.16	1.06	1.83	1.60	1.82	1.16	1.47	1.07	1.40	1.20

MTOT=MONTHLY TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY — PERIOD :1979 WATER YEAR

DATE	GAGE NUMBER											
	1-S	3-S	4-S	5-S	1-ES	2-ES	3-ES	1-H	2-H	3-H	1-A	2-A
MAR												
2	0.67	0.34	0.37	0.57	0.52	0.32	0.31	0.39	0.40	0.34	0.45	0.93
3	0.18	0.01	0.02	0.00	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.01
7	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.36	0.24	0.28	0.28	0.27	0.12	0.15	0.17	0.16	0.14	0.86	0.23
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.37	0.90	0.54	0.82	0.29	0.24	0.28	0.13	0.05	0.20	0.98	0.90
16	0.57	0.32	0.20	0.30	0.36	0.35	0.42	0.47	0.52	0.38	0.40	0.39
17	0.32	0.05	0.08	0.06	0.09	0.08	0.10	0.21	0.26	0.16	0.06	0.05
18	0.04	0.02	0.00	0.00	0.00	0.01	0.02	0.00	0.02	0.00	0.00	0.00
19	0.07	0.28	0.24	0.11	0.30	0.33	0.44	0.13	0.18	0.06	0.08	0.07
20	1.29	0.12	0.04	0.03	1.50	0.92	0.55	1.19	1.42	1.07	0.10	0.08
21	1.44	0.34	0.38	0.25	0.27	0.49	0.83	0.73	0.71	0.78	0.31	0.38
22	0.70	0.37	0.42	0.24	0.65	0.60	0.68	0.34	0.34	0.33	0.49	0.50
29	0.27	0.07	0.00	0.00	0.14	0.14	0.15	0.00	0.17	0.00	0.06	0.05
30	0.20	0.17	0.12	0.10	0.22	0.18	0.25	0.09	0.43	0.44	0.10	0.13
31	0.07	0.04	0.00	0.00	0.04	0.08	0.08	0.43	0.00	0.00	0.12	0.05
MTOT	6.66	3.27	2.69	2.76	4.65	3.88	4.28	4.28	4.66	3.90	4.03	3.78
APR												
1	0.26	0.11	0.00	0.05	0.18	0.29	0.17	0.18	0.20	0.15	0.05	0.10
2	0.28	0.20	0.18	0.30	0.23	0.60	0.50	0.23	0.22	0.25	0.45	0.25
3	0.00	0.02	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.01
4	0.00	0.01	0.00	0.00	0.00	0.02	0.03	0.00	0.00	0.00	0.07	0.01
6	0.00	0.00	0.00	0.00	0.10	0.12	0.00	0.00	0.00	0.00	0.00	0.00
7	0.11	0.01	0.00	0.00	0.00	0.06	0.03	0.07	0.12	0.00	0.00	0.03
8	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.01
9	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.03	0.00	0.00	0.00	0.08	0.06	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.75	1.15	1.00	0.79	0.40	0.77	0.91	0.76	0.79	0.72	0.46	0.71
18	0.05	0.02	0.00	0.00	0.05	0.07	0.07	0.05	0.02	0.05	0.13	0.01
19	0.35	0.28	0.30	0.40	0.30	0.40	0.37	1.02	1.19	0.90	0.05	0.60
20	1.96	1.42	1.08	1.25	0.63	0.75	0.62	1.08	0.79	0.62	1.30	0.47
21	0.68	0.66	0.56	0.61	0.43	0.63	0.63	0.56	0.61	0.60	0.62	0.68
22	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00
29	1.34	1.46	1.57	2.06	1.50	1.96	1.79	1.11	1.95	1.24	1.64	1.62
30	0.22	0.01	0.00	0.00	0.00	0.02	0.03	0.00	0.00	0.00	0.00	0.00
MTOT	6.10	5.40	4.69	5.46	3.82	5.80	5.24	5.06	5.89	4.53	4.77	4.50

MTOT=MONTHLY TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY

PERIOD :1979 WATER YEAR

DATE	GAGE NUMBER											
	1-S	3-S	4-S	5-S	1-ES	2-ES	3-ES	1-H	2-H	3-H	1-A	2-A
MAY												
1	0.07	0.04	0.04	0.00	0.07	0.08	0.03	0.15	0.11	0.00	0.00	0.06
2	0.00	0.01	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.00
3	0.00	0.01	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.02	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00
11	0.14	0.88	0.75	0.00	0.33	0.39	0.86	0.16	0.05	0.04	0.35	0.42
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.15	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.05	0.00	0.00	0.00
20	0.00	0.05	0.02	0.00	0.00	0.07	0.06	0.47	0.45	0.07	0.15	0.28
21	0.07	0.00	0.00	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00
22	0.53	0.59	0.04	0.44	0.48	0.64	0.72	0.00	0.00	0.53	0.64	0.69
27	0.03	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.03	0.03	0.00	0.00
28	0.16	0.41	0.40	0.83	0.19	0.20	0.21	0.65	0.41	0.26	0.53	0.55
30	0.00	0.01	0.00	0.38	0.00	0.00	0.00	0.17	0.03	0.00	0.00	0.00
MTOT	1.00	2.00	1.27	1.65	1.07	1.45	1.95	1.72	1.28	0.93	1.67	2.00
JUN												
1	2.49	3.67	3.84	3.89	3.41	3.56	4.21	1.95	2.10	2.00	3.11	3.18
2	0.72	0.07	0.10	0.20	0.24	0.07	0.16	0.34	0.36	0.32	0.10	0.12
3	0.06	0.00	0.00	0.00	0.04	0.02	0.02	0.06	0.06	0.05	0.00	0.00
4	0.01	0.05	0.00	0.00	0.18	0.06	0.01	0.09	0.06	0.06	0.05	0.05
5	1.65	1.64	1.48	1.65	0.74	1.29	1.21	1.43	1.44	1.38	1.56	1.59
6	0.01	0.03	0.00	0.02	0.00	0.02	0.04	0.00	0.01	0.10	0.01	0.02
7	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.06	0.08	0.00	0.01	0.02
8	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
MTOT	5.07	5.49	5.42	5.76	4.61	5.02	5.65	3.93	4.12	3.91	4.84	4.98

MTOT=MONTHLY TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY PERIOD :1979 WATER YEAR

DATE	GAGE NUMBER											
	1-S	3-S	4-S	5-S	1-ES	2-ES	3-ES	1-H	2-H	3-H	1-A	2-A
JUL												
4	0.01	0.06	0.15	0.00	0.00	0.02	0.00	0.20	0.40	0.00	0.02	0.01
5	0.69	1.47	1.57	2.26	0.45	0.52	0.60	0.11	0.19	0.14	2.15	1.67
6	0.16	0.08	0.10	0.05	0.08	0.01	0.03	0.01	0.09	0.03	0.00	0.00
7	0.00	0.15	0.14	0.00	0.00	0.00	0.15	0.11	0.00	0.00	0.02	0.01
8	0.00	0.02	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.67	0.49	0.03	0.00	0.00	0.08	0.00	0.00	0.00	0.04	0.03
11	0.00	0.02	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.02	0.01
14	0.09	0.19	0.20	0.86	1.46	1.29	1.43	0.00	0.00	0.00	0.00	0.00
15	0.02	0.01	0.00	0.00	0.16	0.00	0.02	0.00	0.00	0.00	0.00	0.00
18	1.07	0.89	0.47	0.20	0.76	1.01	0.66	2.72	3.00	2.32	0.39	0.66
19	1.59	0.00	0.00	1.35	0.59	0.06	0.05	0.01	0.19	0.28	0.03	0.05
20	0.00	0.01	0.11	0.00	0.00	0.04	0.07	0.48	0.10	0.18	0.01	0.01
26	0.00	0.32	0.59	0.58	0.22	0.44	0.45	0.27	0.20	0.00	0.55	0.89
27	1.14	1.33	1.64	1.62	1.60	0.93	1.16	3.21	1.07	0.45	0.10	0.15
28	0.00	0.01	0.01	0.01	0.00	0.00	0.02	0.00	0.00	0.22	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.59	0.00	0.00
MTOT	4.77	5.23	5.47	6.96	5.32	4.32	4.76	7.12	5.24	4.21	3.33	3.49
AUG												
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
11	0.55	0.57	0.40	0.34	0.43	1.42	1.25	1.87	0.36	0.71	0.16	0.24
12	0.13	0.53	0.60	0.47	0.00	0.00	0.03	0.39	0.11	0.19	0.42	0.22
14	0.40	0.06	0.02	0.00	0.08	0.00	0.01	0.00	0.00	0.08	0.00	0.00
15	0.00	0.01	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.04	0.01
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00
23	0.32	0.66	0.55	0.50	0.82	0.32	0.39	0.53	0.36	0.16	0.48	0.95
24	0.00	0.40	0.28	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.07	0.00	0.05	0.01	0.10	0.22	0.19	0.00	0.00	0.00	0.05	0.04
30	0.00	0.01	0.00	0.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MTOT	1.47	2.24	1.90	1.47	1.44	1.96	1.90	2.80	0.90	1.14	1.15	1.46

MTOT=MONTHLY TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY PERIOD :1979 WATER YEAR

DATE	GAGE NUMBER											
	1-S	3-S	4-S	5-S	1-ES	2-ES	3-ES	1-H	2-H	3-H	1-A	2-A
SEPT												
4	0.79	0.00	0.00	0.00	0.00	0.22	0.02	0.25	0.00	0.00	0.00	0.00
5	0.09	0.00	0.00	0.03	0.74	0.00	0.01	0.01	0.02	0.00	0.06	0.22
6	0.94	0.00	0.06	0.26	0.01	0.04	0.01	0.23	0.00	0.23	0.24	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.00	0.35	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.35
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
18	0.52	0.67	0.74	0.46	1.25	1.20	1.26	0.45	0.50	0.23	0.60	0.91
19	0.04	0.05	0.04	0.06	0.21	0.14	0.13	0.27	0.25	0.19	0.18	0.10
MTOT	2.38	0.72	0.84	0.85	2.21	1.60	1.43	1.44	0.91	1.00	1.09	1.58
WTOT	43.32	35.84	31.60	34.31	35.49	34.80	38.91	39.64	37.31	32.02	33.28	33.30

MTOT=MONTHLY TOTALS
WTOT=WATER YEAR TOTAL

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY PERIOD :1979 WATER YEAR

DATE	GAGE NUMBER									
	1-L	2-L	4-L	5-L	1-WM	1-O	2-O	3-O	4-O	NOAA
OCT										
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.30	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.03	0.06	0.00	0.06	0.30	0.31	0.24	0.30	0.24
9	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00
25	0.17	0.11	0.28	0.14	0.45	0.05	0.10	0.00	0.15	0.31
26	0.00	0.00	0.00	0.02	0.03	0.00	0.00	0.00	0.00	0.00
27	0.00	0.01	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
MTOT	0.47	0.40	0.34	0.16	0.58	0.40	0.42	0.24	0.45	0.55
NOV										
5	3.57	3.39	2.88	3.22	2.01	3.95	3.35	3.95	2.48	1.69
11	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.47	0.68	0.15	0.24	0.11	0.52	0.89	0.91	0.15	0.35
16	0.16	0.15	0.25	0.20	0.31	0.23	0.20	0.27	0.16	0.37
17	0.00	0.03	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.26	0.37	0.24	0.18	0.12	0.45	0.54	0.00	0.31	0.22
20	0.03	0.04	0.10	0.01	0.15	0.05	0.07	0.44	0.06	0.10
21	0.06	0.07	0.00	0.00	0.01	0.00	0.01	0.08	0.00	0.01
22	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.03
23	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.02	0.00	0.02	0.00	0.00	0.05
25	0.05	0.07	0.00	0.00	0.01	0.00	0.03	0.00	0.00	0.00
26	1.73	1.99	1.43	1.10	0.47	1.17	1.07	0.98	1.28	2.03
27	0.05	0.07	0.00	0.00	0.00	0.15	0.24	0.00	0.00	0.06
28	0.00	0.05	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00
29	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.02	0.00
30	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00
MTOT	6.38	6.96	5.05	4.95	3.24	6.52	6.48	6.63	4.47	4.91

MTOT=MONTHLY TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY PERIOD :1979 WATER YEAR

DATE	GAGE NUMBER									
	1-L	2-L	4-L	5-L	1-WH	1-0	2-0	3-0	4-0	NOAA
DEC										
2	0.00	0.02	0.00	0.00	0.00	0.00	0.01	0.20	0.01	0.00
3	0.00	0.01	0.00	0.00	0.01	0.00	0.06	0.10	0.06	0.09
4	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00
5	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
6	0.00	0.01	0.00	0.00	0.00	0.00	0.02	0.00	0.02	0.01
7	0.00	0.01	0.00	0.00	0.00	0.00	0.02	0.00	0.02	0.02
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00
13	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.01
14	0.13	0.06	0.15	0.05	0.05	0.12	0.08	0.00	0.08	0.08
16	0.00	0.01	0.00	0.00	0.01	0.00	0.01	0.00	0.08	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.03	0.00	0.00	0.01	0.00	0.01	0.00	0.03	0.02
26	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00
28	0.04	0.03	0.00	0.00	0.03	0.10	0.07	0.00	0.07	0.05
29	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.10	0.01	0.00
30	0.16	0.00	0.21	0.04	0.12	0.14	0.14	0.13	0.14	0.05
31	1.77	1.68	0.58	0.47	0.62	1.40	1.25	1.32	0.25	0.76
MTOT	2.10	1.86	0.94	0.56	0.94	1.76	1.70	1.85	0.79	1.09
CTOT	33.01	31.41	31.26	25.79	24.99	36.34	37.10	35.26	28.10	35.99

MTOT=MONTHLY TOTALS
CTOT=CALENDAR YEAR TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY PERIOD :1979 WATER YEAR

DATE	GAGE NUMBER									
	1-L	2-L	4-L	5-L	1-WM	1-0	2-0	3-0	4-0	NOAA
JAN										
1	0.07	0.52	0.70	0.35	0.62	0.22	0.19	0.20	0.19	0.30
2	0.00	0.00	0.00	0.08	0.00	0.20	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.19	0.00	0.00	0.09	0.00	0.18	0.00	0.00	0.17
5	0.00	0.05	0.00	0.00	0.07	0.06	0.06	0.35	0.18	0.06
6	0.00	0.01	0.00	0.00	0.08	0.02	0.05	0.28	0.06	0.06
10	1.70	1.66	1.29	1.10	1.56	1.01	1.45	1.45	1.47	2.15
11	0.20	0.15	0.11	0.13	0.06	0.08	0.06	0.04	0.05	0.04
12	0.00	0.05	0.05	0.00	0.00	0.00	0.01	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.01
17	0.02	0.00	0.00	0.00	0.03	0.00	0.02	0.00	0.00	0.02
18	0.35	0.33	0.11	0.13	0.15	0.00	0.19	0.28	0.22	0.29
19	0.07	0.11	0.25	0.17	0.13	0.00	0.20	0.24	0.16	0.22
20	0.03	0.03	0.04	0.00	0.06	0.00	0.03	0.02	0.02	0.00
21	0.00	0.01	0.00	0.00	0.00	0.20	0.00	0.10	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.37	0.31	0.36	0.18	0.33	0.36	0.33	0.36	0.38	0.42
26	0.00	0.04	0.00	0.00	0.01	0.00	0.02	0.03	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.00	0.00
28	0.00	0.02	0.00	0.00	0.00	0.06	0.04	0.00	0.00	0.05
29	0.20	0.23	0.05	0.14	0.24	0.26	0.27	0.00	0.36	0.27
30	0.00	0.01	0.00	0.00	0.03	0.00	0.04	0.00	0.00	0.01
MTOT	3.01	3.72	2.96	2.28	3.46	2.47	3.16	3.65	3.09	4.07
FEB										
2	0.08	0.04	0.00	0.00	0.04	0.00	0.04	0.02	0.04	0.06
3	0.24	0.27	0.14	0.14	0.15	0.03	0.20	0.12	0.20	0.17
4	0.35	0.36	0.28	0.20	0.23	0.19	0.37	0.26	0.35	0.36
5	0.38	0.34	0.40	0.26	0.49	0.10	0.28	0.17	0.25	0.24
6	0.16	0.24	0.15	0.12	0.22	0.24	0.32	0.22	0.22	0.31
7	0.00	0.00	0.00	0.00	0.00	0.36	0.00	0.16	0.00	0.00
13	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
19	0.10	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
20	0.00	0.03	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.05
21	0.00	0.01	0.00	0.00	0.00	0.00	0.04	0.04	0.00	0.00
22	0.10	0.08	0.04	0.00	0.00	0.02	0.04	0.06	0.00	0.02
23	0.24	0.18	0.10	0.00	0.06	0.05	0.13	0.14	0.08	0.15
28	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
MTOT	1.65	1.57	1.11	0.72	1.29	0.94	1.42	1.21	1.14	1.38

MTOT=MONTHLY TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY　　PERIOD :1979 WATER YEAR

DATE	GAGE NUMBER									
	1-L	2-L	4-L	5-L	1-WH	1-0	2-0	3-0	4-0	NOAA
MAR										
2	0.47	0.59	0.46	0.26	0.33	0.42	0.36	0.53	0.63	0.42
3	0.00	0.07	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
7	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.17	0.17	0.14	0.00	0.07	0.00	0.09	0.15	0.40	0.39
12	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
15	0.36	0.30	0.23	0.20	0.15	0.00	0.20	0.02	1.18	1.01
16	0.51	0.53	0.43	0.12	0.49	0.00	0.42	0.39	0.18	0.37
17	0.20	0.18	0.00	0.03	0.01	0.00	0.07	0.06	0.04	0.07
18	0.00	0.03	0.00	0.00	0.01	0.15	0.01	0.00	0.00	0.00
19	0.33	0.27	0.14	0.03	0.04	0.00	0.05	0.05	0.00	0.15
20	1.75	1.97	0.02	0.00	0.03	0.94	0.77	0.35	0.15	0.18
21	0.58	0.76	0.29	0.18	0.09	0.91	0.64	0.50	0.28	0.23
22	0.35	0.62	0.50	0.40	0.47	0.46	0.50	0.52	0.42	0.45
29	0.18	0.16	0.02	0.00	0.03	0.11	0.07	0.11	0.00	0.09
30	0.34	0.14	0.10	0.00	0.16	0.14	0.14	0.17	0.10	0.16
31	0.06	0.03	0.11	0.00	0.03	0.05	0.07	0.08	0.00	0.02
MTOT	5.30	5.85	2.44	1.22	1.91	3.18	3.40	2.93	3.38	3.55
APR										
1	0.39	0.21	0.06	0.00	0.04	0.10	0.08	0.08	0.13	0.07
2	0.24	0.39	0.35	0.24	0.35	0.18	0.40	0.28	0.15	0.16
3	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
4	0.00	0.02	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.16	0.02	0.00	0.00	0.00	0.23	0.03	0.00	0.00	0.04
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.01	0.00	0.02	0.00	0.00	0.04
16	0.00	0.00	0.00	0.00	0.00	0.26	0.01	1.05	0.00	0.00
17	0.67	0.63	0.62	0.49	0.63	0.57	0.90	0.00	0.76	1.00
18	0.07	0.06	0.59	0.17	0.02	0.03	0.01	0.00	0.03	0.01
19	0.37	0.35	0.39	0.69	1.27	0.61	0.77	0.90	0.40	0.33
20	1.90	1.79	1.67	0.58	1.46	1.60	1.78	1.61	1.20	1.34
21	0.70	0.66	0.49	0.50	0.46	0.65	0.66	0.71	0.60	0.72
22	0.00	0.00	0.55	0.00	0.00	0.00	0.02	0.00	0.00	0.00
29	1.49	1.40	0.96	0.54	0.78	1.43	1.43	1.48	1.73	1.63
30	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
MTOT	5.99	5.54	5.68	3.21	5.06	5.66	6.11	6.11	5.00	5.34

MTOT=MONTHLY TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY PERIOD :1979 WATER YEAR

DATE	GAGE NUMBER									
	1-L	2-L	4-L	5-L	1-WH	1-0	2-0	3-0	4-0	NOAA
MAY										
1	0.00	0.10	0.00	0.00	0.01	0.00	0.14	0.14	0.00	0.03
2	0.10	0.02	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.01
3	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
4	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.00	0.00	0.00
9	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.10	0.01
11	0.00	0.14	0.72	0.32	0.39	0.00	0.18	0.18	0.45	0.77
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.14	0.10	0.02	0.06	0.00	0.08	0.13	0.04	0.08
21	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.58	0.00	0.46	0.78	0.00	0.43	0.61	0.48	0.64
27	0.04	0.00	0.00	0.01	0.01	0.02	0.01	0.00	0.02	0.28
28	0.30	0.35	0.77	0.71	1.08	0.26	0.27	0.27	0.40	0.12
30	0.03	0.01	0.20	0.03	0.74	0.00	0.00	0.00	0.00	0.02
MTOT	0.47	1.45	1.64	1.55	3.08	0.49	1.12	1.40	1.49	1.98
JUN										
1	1.31	1.74	3.81	3.67	2.90	2.48	2.37	2.70	3.82	3.87
2	0.56	0.45	0.08	0.07	0.06	0.19	0.18	0.07	0.11	0.13
3	0.05	0.03	0.00	0.01	0.00	0.00	0.02	0.00	0.00	0.00
4	0.15	0.00	0.11	0.00	0.02	0.00	0.05	0.10	0.00	0.03
5	1.47	0.01	1.63	1.69	1.99	2.48	1.59	1.50	1.67	1.50
6	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.04	0.00
7	0.03	0.00	0.00	0.00	0.00	0.05	0.04	0.07	0.02	0.04
8	0.02	0.04	0.02	0.00	0.00	0.24	0.11	0.00	0.06	0.02
MTOT	3.59	2.28	5.65	5.45	4.97	5.44	4.36	4.44	5.72	5.59

MTOT=MONTHLY TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY PERIOD :1979 WATER YEAR

DATE	GAGE NUMBER									
	1-L	2-L	4-L	5-L	1-WM	1-O	2-O	3-O	4-O	NOAA
JUL										
4	0.05	0.10	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.03
5	0.29	0.33	1.34	1.09	1.22	0.81	0.88	1.61	2.12	1.85
6	0.32	0.18	0.00	0.00	0.02	0.03	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.43	0.27	0.05
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.01	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00
10	0.13	0.05	0.09	0.02	0.17	0.00	0.00	0.00	0.01	0.39
11	0.00	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00
14	0.15	0.00	0.03	0.06	0.00	0.51	0.52	0.08	0.00	0.05
15	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
18	4.00	2.86	1.10	0.89	1.36	2.49	1.78	1.40	1.75	2.70
19	0.01	0.01	0.02	0.00	0.51	0.00	0.04	0.01	0.11	0.00
20	0.04	0.00	0.09	0.08	0.00	0.00	0.00	0.02	0.06	0.13
26	0.00	0.04	1.19	1.45	0.59	0.00	0.00	0.06	0.00	0.17
27	1.40	0.65	0.09	0.06	0.43	0.54	0.47	0.86	1.09	1.98
28	0.00	0.01	0.02	0.00	0.01	0.00	0.03	0.02	0.02	0.03
29	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MTOT	6.39	4.25	3.97	3.72	4.31	4.38	3.81	4.66	5.44	7.38
AUG										
5	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00
11	0.93	0.52	0.00	0.00	0.00	0.79	0.55	0.36	0.72	0.65
12	0.30	0.44	0.68	1.29	0.69	0.03	0.07	0.11	0.42	0.44
14	0.07	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.02	0.05	0.54	0.13	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.45	0.12	0.52	0.65	0.58	0.71	0.51	0.36	0.74	0.63
24	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32
29	0.00	0.00	0.64	0.54	0.16	0.00	0.00	0.00	0.00	0.05
30	0.00	0.00	0.00	0.00	0.92	0.00	0.00	0.00	0.00	0.00
MTOT	1.86	1.34	2.38	2.68	2.35	1.53	1.13	0.83	1.88	2.09

MTOT=MONTHLY TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY

PERIOD :1979 WATER YEAR

DATE	GAGE NUMBER									
	1-L	2-L	4-L	5-L	1-WM	1-0	2-0	3-0	4-0	NOAA
SEPT										
4	0.36	0.05	0.00	0.28	0.00	0.00	0.00	0.00	0.00	0.00
5	0.07	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.02	0.00
6	0.02	0.26	0.00	0.00	0.40	0.15	0.09	0.00	0.00	0.01
7	0.00	0.10	0.00	0.00	0.03	0.31	0.01	0.00	0.00	0.00
8	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.01	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.66	0.48	0.17	0.00	0.21	0.99	0.71	0.82	0.58	0.83
19	0.20	0.25	0.05	0.00	0.05	0.13	0.20	0.14	0.18	0.02
MTOT	1.53	1.14	0.99	0.28	0.69	1.58	1.02	0.98	0.78	0.86
WTOT	38.74	36.36	33.35	26.78	31.88	34.40	34.13	34.93	33.63	38.79

MTOT=MONTHLY TOTALS

STA. NO. 08177700 | STORM RAINFALL AND RUNOFF RECORD | 1979 WATER YEAR

OLMOS CREEK AT DRESDEN DRIVE, SAN ANTONIO, TX. | STORM OF NOV. 5, 1978

DATE & TIME	GAGE NUMBER 1-0	2-0	3-0	4-0				ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN CFS	ACCUM. RUNOFF IN.
NOV 5										
0000	0.0	0.0	0.0	0.0				0.0	0.8	0.0003
0930	0.0	0.0	0.0	0.0				0.0	0.8	0.0006
1000	0.11	0.0	0.04	0.0				0.06	0.7	0.0006
1030	0.16	0.0	0.09	0.0				0.04	0.7	0.0006
1045	0.16	0.0	0.09	0.0				0.09	0.8	0.0006
1100	0.17	0.14	0.09	0.05				0.12	0.9	0.0006
1115	0.25	0.14	0.09	0.06				0.16	1.3	0.0007
1130	0.26	0.14	0.20	0.08				0.21	1.7	0.0007
1145	0.28	0.14	0.20	0.08				0.22	2.0	0.0007
1200	0.40	0.20	0.32	0.18				0.31	2.8	0.0008
1215	0.60	0.20	0.43	0.19				0.43	3.6	0.0009
1230	0.60	0.28	0.43	0.20				0.44	4.5	0.0009
1245	0.60	0.28	0.43	0.20				0.44	5.6	0.0010
1300	0.75	0.35	0.49	0.20				0.53	6.6	0.0012
1315	0.85	0.46	0.75	0.21				0.69	8.4	0.0013
1330	1.00	0.48	0.80	0.22				0.76	9.4	0.0015
1345	1.25	0.46	1.00	0.22				0.93	10.0	0.0017
1400	1.75	0.57	1.30	0.36				1.25	26.0	0.0021
1415	2.10	0.72	1.70	0.45				1.56	44.0	0.0030
1430	2.45	0.85	2.15	0.58				1.89	73.0	0.0043
1445	2.60	0.98	2.58	0.70				2.15	106.0	0.0062
1500	2.60	1.22	2.58	1.08				2.22	166.0	0.0093
1515	2.60	1.49	2.58	1.23				2.28	264.0	0.0141
1530	2.60	1.79	2.58	1.36				2.35	362.0	0.0207
1545	2.60	1.99	2.58	1.39				2.39	504.0	0.0299
1600	2.60	2.06	2.58	1.40				2.40	691.0	0.0425
1615	2.60	2.07	2.58	1.40				2.40	691.0	0.0552
1630	2.75	2.07	2.65	1.40				2.48	630.0	0.0667
1645	2.80	2.07	2.72	1.45				2.56	548.0	0.0767
1700	3.00	2.07	2.80	1.50				2.63	452.0	0.0849
1715	3.30	2.07	3.23	1.50				2.91	383.0	0.0919
1730	3.49	2.12	3.29	1.50				3.00	327.0	0.0979
1745	3.75	2.24	3.44	1.70				3.19	264.0	0.1027
1800	3.79	2.28	3.60	1.70				3.27	252.0	0.1073
1815	3.83	2.71	3.67	1.74				3.40	317.0	0.1131
1830	3.90	2.78	3.88	1.78				3.52	374.0	0.1200
1845	3.95	2.90	3.88	2.00				3.58	499.0	0.1291
1900	3.95	3.00	3.89	2.38				3.63	652.0	0.1410
1915	3.95	3.04	3.90	2.39				3.64	773.0	0.1551

STA. NO. 08177700 STORM RAINFALL AND RUNOFF RECORD 1979 WATER YEAR

OLMOS CREEK AT DRESDEN DRIVE, SAN ANTONIO, TX. STORM OF NOV. 5, 1978

DATE & TIME	GAGE NUMBER							ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN CFS	ACCUM. RUNOFF IN.
	1-0	2-0	3-0	4-0						
NOV 5										
1930	3.95	3.29	3.91	2.40				3.69	882.0	0.1712
1945	3.95	3.30	3.91	2.40				3.69	863.0	0.1870
2000	3.95	3.31	3.94	2.40				3.71	742.0	0.2074
2030	3.95	3.32	3.95	2.40				3.72	548.0	0.2274
2100	3.95	3.34	3.95	2.44				3.72	510.0	0.2460
2130	3.95	3.35	3.95	2.48				3.72	406.0	0.2609
2200	3.95	3.35	3.95	2.48				3.72	323.0	0.2845
2330	3.95	3.35	3.95	2.48				3.72	158.0	0.2960
2400	3.95	3.35	3.95	2.48				3.72	170.0	0.2991

STA. NO. 08178700 — STORM RAINFALL AND RUNOFF RECORD — 1979 WATER YEAR

SALADO CREEK (UPPER STA) AT SAN ANTONIO, TX. — STORM OF APRIL 20-21, 1979

DATE & TIME	GAGE NUMBER 1-S	GAGE NUMBER 3-S	GAGE NUMBER 2-0	GAGE NUMBER 3-0				ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN CFS	ACCUM. RUNOFF IN.
APR 20										
0000	0.0	0.0	0.0	0.0				0.0	8.0	0.0000
0030	0.0	0.0	0.0	0.0				0.0	8.0	0.0001
0100	0.0	0.0	0.02	0.02				0.00	7.5	0.0001
0130	0.0	0.0	0.04	0.04				0.00	7.5	0.0002
0200	0.0	0.10	0.07	0.08				0.03	7.5	0.0002
0220	0.0	0.11	0.09	0.09				0.03	7.5	0.0002
0230	0.0	0.12	0.09	0.11				0.04	7.5	0.0002
0300	0.0	0.12	0.09	0.13				0.04	7.5	0.0004
0700	0.0	0.12	0.09	0.13				0.04	6.6	0.0006
0800	0.0	0.12	0.10	0.13				0.04	6.6	0.0009
1400	0.0	0.13	0.11	0.13				0.04	6.1	0.0013
2130	0.0	0.13	0.11	0.13				0.04	4.9	0.0016
2145	0.07	0.13	0.11	0.13				0.09	4.9	0.0016
2200	0.82	0.13	0.25	0.13				0.61	4.9	0.0016
2215	1.30	0.26	0.87	0.13				1.01	4.9	0.0016
2230	1.60	0.71	1.31	0.13				1.35	4.9	0.0016
2245	1.78	1.09	1.44	0.45				1.57	5.3	0.0016
2300	1.83	1.15	1.55	1.10				1.64	7.5	0.0016
2315	1.86	1.19	1.58	1.40				1.68	12.0	0.0017
2330	1.90	1.32	1.65	1.49				1.74	9.7	0.0017
2345	1.94	1.38	1.73	1.51				1.79	61.0	0.0019
2400	1.96	1.42	1.78	1.61				1.82	16.0	0.0019
APR 21										
0000	1.96	1.42	1.78	1.61				1.82	16.0	0.0019
0030	2.17	1.51	1.91	1.72				1.99	103.0	0.0025
0100	2.26	1.65	2.04	1.82				2.10	982.0	0.0081
0130	2.41	1.79	2.20	1.95				2.25	1730.0	0.0179
0200	2.49	1.91	2.31	2.04				2.34	1960.0	0.0290
0230	2.58	2.01	2.41	2.21				2.43	3290.0	0.0476
0300	2.61	2.04	2.43	2.28				2.46	5350.0	0.0778
0330	2.64	2.05	2.43	2.32				2.49	6120.0	0.1124
0400	2.64	2.07	2.43	2.32				2.49	6000.0	0.1633
0500	2.64	2.07	2.43	2.32				2.49	4800.0	0.2176
0600	2.64	2.07	2.43	2.32				2.49	3200.0	0.2538
0700	2.64	2.07	2.43	2.32				2.49	2340.0	0.2803
0800	2.64	2.07	2.43	2.32				2.49	1630.0	0.2987
0900	2.64	2.07	2.43	2.32				2.49	1200.0	0.3123
1000	2.64	2.07	2.43	2.32				2.49	952.0	0.3231
1100	2.64	2.07	2.44	2.32				2.49	759.0	0.3316
1200	2.64	2.08	2.44	2.32				2.49	652.0	0.3390

STA. NO. 08178700 STORM RAINFALL AND RUNOFF RECORD 1979 WATER YEAR

SALADO CREEK (UPPER STA) AT SAN ANTONIO, TX. STORM OF APRIL 20-21, 1979

DATE & TIME	GAGE NUMBER 1-S	3-S	2-0	3-0				ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN CFS	ACCUM. RUNOFF IN.
APR 21										
1300	2.64	2.08	2.44	2.32				2.49	550.0	0.3484
1500	2.64	2.08	2.44	2.32				2.49	297.0	0.3567
1800	2.64	2.08	2.44	2.32				2.49	169.0	0.3625
2100	2.64	2.08	2.44	2.32				2.49	92.0	0.3656
2400	2.64	2.08	2.44	2.32				2.49	55.0	0.3665

STA. NO. 08181450 STORM RAINFALL AND RUNOFF RECORD 1979 WATER YEAR

LEON CREEK TRIBUTARY AT KELLY AFB, TX. STORM OF APRIL 19-21, 1979

DATE & TIME	GAGE NUMBER							ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN CFS	ACCUM. RUNOFF IN.
	4-L	5-L								
APR 19										
0000	0.0	0.0						0.0	0.0	0.0
0015	0.03	0.0						0.02	0.0	0.0
0030	0.10	0.33						0.14	0.0	0.0
0100	0.13	0.40						0.23	4.6	0.0030
0130	0.18	0.43						0.27	1.2	0.0040
0215	0.29	0.51						0.37	0.2	0.0041
0230	0.37	0.61						0.46	25.0	0.0163
0300	0.39	0.69						0.50	37.0	0.0524
0400	0.39	0.69						0.50	32.0	0.0941
0500	0.39	0.69						0.50	29.0	0.1319
0600	0.39	0.69						0.50	19.0	0.1566
0700	0.39	0.69						0.50	13.0	0.1735
0800	0.39	0.69						0.50	7.4	0.1832
0900	0.39	0.69						0.50	4.2	0.1887
1000	0.39	0.69						0.50	2.4	0.1918
1100	0.39	0.69						0.50	1.0	0.1931
1200	0.39	0.69						0.50	0.5	0.1937
1300	0.39	0.69						0.50	0.2	0.1939
1330	0.39	0.69						0.50	0.1	0.1946
2400	0.39	0.69						0.50	0.1	0.1960
APR 20										
0000	0.39	0.69						0.50	0.1	0.1960
2000	0.39	0.69						0.50	0.1	0.1981
2200	0.49	0.69						0.56	0.1	0.1982
2215	1.34	0.69						1.10	0.1	0.1982
2230	1.49	0.69						1.19	0.1	0.1983
2245	1.67	0.83						1.36	0.1	0.1983
2300	1.88	0.97						1.54	0.1	0.1983
2315	1.92	1.06						1.60	1.2	0.1987
2330	1.94	1.14						1.64	1.5	0.1992
2345	1.99	1.21						1.70	1.5	0.1997
2400	2.06	1.27						1.77	1.5	0.2002
APR 21										
0000	2.06	1.27						1.77	1.5	0.2002
0030	2.21	1.31						1.88	1.0	0.2009
0045	2.24	1.36						1.91	110.0	0.2367
0100	2.26	1.41						1.96	116.0	0.2934
0130	2.39	1.49						2.06	92.0	0.3533
0200	2.48	1.59						2.15	81.0	0.4060
0230	2.52	1.67						2.21	76.0	0.4555
0300	2.55	1.69						2.23	64.0	0.4972

STA. NO. 08181450 STORM RAINFALL AND RUNOFF RECORD 1979 WATER YEAR

LEON CREEK TRIBUTARY AT KELLY AFB. TX. STORM OF APRIL 19-21, 1979

DATE & TIME	GAGE NUMBER							ACCUM. WEIGHTED PRECIP. IN.	DISCHANGE IN CFS	ACCUM. RUNOFF IN.
	4-L	5-L								
APR 21										
0330	2.55	1.77						2.26	55.0	0.5688
0500	2.55	1.77						2.26	36.0	0.6508
0700	2.55	1.77						2.26	16.0	0.6925
0400	2.55	1.77						2.26	5.5	0.7068
1100	2.55	1.77						2.26	2.7	0.7121
1200	2.55	1.77						2.26	0.5	0.7127
1300	2.55	1.77						2.26	0.2	0.7130
1345	2.55	1.77						2.26	0.1	0.7133
1800	2.55	1.77						2.26	0.1	0.7136
1900	2.55	1.77						2.26	0.0	0.7136
2400	2.55	1.77						2.26	0.0	0.7136

STA. NO. 08177600 STORM RAINFALL AND RUNOFF RECORD 1979 WATER YEAR

OLMOS CREEK TRIB AT FM 1535, SHAVANO PARK, TEX. STORM OF MARCH 20-21, 1979

DATE & TIME	GAGE NUMBER 2-0							ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN CFS	ACCUM. RUNOFF IN.
MAR 20								0.0	0.0	0.0
0000	0.0							0.0	0.0	0.0
1915	0.0							0.06	0.0	0.0
2000	0.06							0.06	0.0	0.0
2100	0.06							0.25	0.0	0.0
2115	0.25							0.60	0.0	0.0
2130	0.60							0.64	0.0	0.0
2200	0.64							0.65	0.0	0.0
2350	0.65							0.77	0.0	0.0
2400	0.77									
MAR 21								0.77	0.0	0.0
0000	0.77							0.81	0.0	0.0
0005	0.81							0.88	0.0	0.0
0015	0.86							0.94	0.0	0.0
0030	0.94							1.00	0.0	0.0
0105	1.00							1.27	32.0	0.0125
0110	1.27							1.37	36.0	0.0266
0115	1.37							1.39	35.0	0.0472
0120	1.39							1.39	31.0	0.0714
0130	1.39							1.39	8.0	0.0808
0140	1.39							1.39	7.0	0.0877
0200	1.39							1.41	16.0	0.0970
0205	1.41							1.41	39.0	0.1352
0215	1.41							1.41	44.0	0.1869
0230	1.41							1.41	45.0	0.2397
0245	1.41							1.41	44.0	0.2913
0300	1.41							1.41	43.0	0.3418
0315	1.41							1.41	41.0	0.4140
0330	1.41							1.41	38.0	0.5032
0400	1.41							1.41	27.0	0.5666
0430	1.41							1.41	11.0	0.6054
0500	1.41							1.41	6.0	0.6335
0600	1.41							1.41	4.0	0.6617
0700	1.41							1.41	0.0	0.6617
0900	1.41							1.41	0.0	0.6617
2400	1.41									

STA. NO. 08177600 STORM RAINFALL AND RUNOFF RECORD 1979 WATER YEAR

OLMOS CREEK TRIB AT FM 1535, SHAVANO PARK, TEX. STORM OF MARCH 20-21, 1979

DATE & TIME	GAGE NUMBER							ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN CFS	ACCUM. RUNOFF IN.
	P-0									
MAR 20										
0000	0.0							0.0	0.0	0.0
1915	0.0							0.0	0.0	0.0
2000	0.06							0.06	0.0	0.0
2100	0.06							0.06	0.0	0.0
2115	0.25							0.25	0.0	0.0
2130	0.60							0.60	0.0	0.0
2200	0.64							0.64	0.0	0.0
2350	0.65							0.65	0.0	0.0
2400	0.77							0.77	0.0	0.0
MAR 21										
0000	0.77							0.77	0.0	0.0
0005	0.81							0.81	0.0	0.0
0015	0.88							0.88	0.0	0.0
0030	0.94							0.94	0.0	0.0
0105	1.00							1.00	0.0	0.0
0110	1.27							1.27	32.0	0.0125
0115	1.37							1.37	36.0	0.0266
0120	1.39							1.39	35.0	0.0472
0130	1.39							1.39	31.0	0.0714
0140	1.39							1.39	8.0	0.0808
0200	1.39							1.39	7.0	0.0877
0205	1.41							1.41	16.0	0.0970
0215	1.41							1.41	39.0	0.1352
0230	1.41							1.41	44.0	0.1869
0245	1.41							1.41	45.0	0.2397
0300	1.41							1.41	44.0	0.2913
0315	1.41							1.41	43.0	0.3418
0330	1.41							1.41	41.0	0.4140
0400	1.41							1.41	38.0	0.5032
0430	1.41							1.41	27.0	0.5666
0500	1.41							1.41	11.0	0.6054
0600	1.41							1.41	6.0	0.6335
0700	1.41							1.41	4.0	0.6617
0900	1.41							1.41	0.0	0.6617
2400	1.41							1.41	0.0	0.6617

STA. NO. 08178300 STORM RAINFALL AND RUNOFF RECORD 1979 WATER YEAR

ALAZAN CREEK AT ST. CLOUD ST., SAN ANTONIO, TEXAS STORM OF MARCH 21-22, 1979

DATE & TIME	GAGE NUMBER 1-3	2-A						ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN CFS	ACCUM. RUNOFF IN.
MAR 21										
0000	0.0	0.0						0.0	0.0	0.0
0005	0.03	0.01						0.02	0.0	0.0
0025	0.05	0.0						0.04	0.0	0.0
0030	0.06	0.01						0.05	0.0	0.0
0045	0.07	0.01						0.05	0.0	0.0
0055	0.21	0.06						0.17	0.0	0.0
0115	0.21	0.07						0.17	26.0	0.0036
0130	0.21	0.08						0.17	42.0	0.0078
0140	0.21	0.08						0.17	81.0	0.0142
0150	0.21	0.08						0.17	68.0	0.0196
0200	0.21	0.08						0.17	52.0	0.0278
0230	0.21	0.08						0.17	29.0	0.0347
0300	0.21	0.08						0.17	24.0	0.0409
0335	0.21	0.08						0.17	10.0	0.0433
0400	0.21	0.08						0.17	4.0	0.0456
0600	0.21	0.08						0.17	0.0	0.0456
0945	0.21	0.08						0.17	0.0	0.0456
1010	0.21	0.08						0.17	10.0	0.0467
1015	0.23	0.10						0.19	21.0	0.0484
1030	0.27	0.32						0.28	29.0	0.0519
1045	0.30	0.36						0.32	60.0	0.0590
1100	0.30	0.37						0.32	77.0	0.0681
1115	0.30	0.37						0.32	60.0	0.0753
1130	0.30	0.37						0.32	55.0	0.0851
1200	0.30	0.37						0.32	34.0	0.0972
1300	0.30	0.37						0.32	23.0	0.1081
1400	0.30	0.38						0.32	14.0	0.1131
1430	0.30	0.38						0.32	4.0	0.1150
1600	0.30	0.38						0.32	2.0	0.1161
1645	0.30	0.38						0.32	0.0	0.1161
1900	0.31	0.38						0.33	0.0	0.1161
2400	0.31	0.38						0.33	0.0	0.1161
MAR 22										
0000	0.31	0.38						0.33	0.0	0.1161
0445	0.31	0.36						0.33	0.0	0.1161
0500	0.31	0.36						0.33	13.0	0.1176
0515	0.64	0.38						0.57	18.0	0.1191
0520	0.73	0.41						0.64	19.0	0.1198
0525	0.73	0.55						0.68	21.0	0.1206
0530	0.80	0.68						0.77	25.0	0.1221

STA. NO. 08178300 STORM RAINFALL AND RUNOFF RECORD 1979 WATER YEAR

ALAZAN CREEK AT ST. CLOUD ST., SAN ANTONIO, TEXAS STORM OF MARCH 21-22, 1979

DATE & TIME	GAGE NUMBER							ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN CFS	ACCUM. RUNOFF IN.
	1-A	2-A								
MAR 22										
0540	0.80	0.83						0.81	105.0	0.1284
0545	0.80	0.85						0.81	220.0	0.1371
0550	0.80	0.86						0.82	383.0	0.1522
0555	0.80	0.86						0.82	407.0	0.1684
0600	0.80	0.86						0.82	359.0	0.1826
0605	0.80	0.86						0.82	286.0	0.1939
0610	0.80	0.86						0.82	231.0	0.2031
0615	0.80	0.86						0.82	178.0	0.2101
0620	0.80	0.86						0.82	143.0	0.2186
0630	0.80	0.86						0.82	95.0	0.2280
0645	0.80	0.86						0.82	66.0	0.2359
0700	0.80	0.86						0.82	48.0	0.2501
0000	0.80	0.86						0.82	25.0	0.2620
0900	0.80	0.87						0.82	6.0	0.2677
1200	0.80	0.88						0.82	2.0	0.2710
1600	0.80	0.88						0.82	0.0	0.2710
2400	0.80	0.88						0.82	0.0	0.2710

STA. NO. 08178555 STORM RAINFALL AND RUNOFF RECORD 1979 WATER YEAR

HARLANDALE CREEK AT WEST HARDING BLVD., SAN ANTONIO, TX. STORM OF APRIL 20-21, 1979

DATE & TIME	GAGE NUMBER							ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN CFS	ACCUM. RUNOFF IN.
	1-WH									
APR 20										
0000	0.0							0.0	0.0	0.0
2215	0.0							0.0	0.0	0.0
2220	0.13							0.13	0.0	0.0
2225	0.42							0.42	0.0	0.0
2230	0.77							0.77	0.0	0.0
2235	0.94							0.94	0.0	0.0
2240	1.09							1.09	0.0	0.0
2245	1.16							1.16	0.0	0.0
2300	1.23							1.23	8.5	0.0011
2310	1.26							1.26	43.0	0.0046
2315	1.27							1.27	94.0	0.0120
2325	1.30							1.30	123.0	0.0219
2330	1.34							1.34	124.0	0.0350
2345	1.40							1.40	115.0	0.0473
2350	1.41							1.41	139.0	0.0583
2400	1.46							1.46	201.0	0.0770
APR 21										
0000	1.46							1.46	201.0	0.0770
0015	1.52							1.52	191.0	0.1053
0020	1.54							1.54	184.0	0.1151
0025	1.57							1.57	187.0	0.1251
0030	1.59							1.59	175.0	0.1437
0045	1.64							1.64	145.0	0.1668
0100	1.68							1.68	127.0	0.1971
0130	1.75							1.75	102.0	0.2297
0200	1.81							1.81	89.0	0.2722
0300	1.91							1.91	66.0	0.3143
0400	1.92							1.92	40.0	0.3398
0500	1.92							1.92	20.0	0.3526
0600	1.92							1.92	9.7	0.3619
0800	1.92							1.92	2.0	0.3642
0945	1.92							1.92	0.5	0.3647
1045	1.92							1.92	0.0	0.3647
2400	1.92							1.92	0.0	0.3647

STA. NO. 08178555 STORM RAINFALL AND RUNOFF RECORD 1979 WATER YEAR

HARLANDALE CREEK AT WEST HARDING BLVD., SAN ANTONIO, TX. STORM OF JUNE 1, 1979

DATE & TIME	GAGE NUMBER							ACCUM. WEIGHTED PRECIP.	DISCHARGE IN	ACCUM. RUNOFF
	1-M							IN.	CFS	IN.
JUN 1										
0000	0.0							0.0	0.0	0.0
0805	0.0							0.0	0.0	0.0
0810	0.01							0.01	0.0	0.0
0845	0.15							0.15	0.0	0.0
0850	0.35							0.35	0.0	0.0
0855	0.55							0.55	0.0	0.0
0900	0.71							0.71	0.0	0.0
0905	0.92							0.92	0.5	0.0000
0915	1.07							1.07	6.6	0.0009
0930	1.27							1.27	26.0	0.0051
0945	1.38							1.38	69.0	0.0161
1000	1.47							1.47	133.0	0.0373
1015	1.52							1.52	157.0	0.0581
1025	1.54							1.54	160.0	0.0836
1045	1.63							1.63	157.0	0.1128
1100	1.83							1.83	170.0	0.1399
1115	2.06							2.06	236.0	0.1964
1145	2.29							2.29	352.0	0.3086
1215	2.37							2.37	365.0	0.3959
1230	2.38							2.38	350.0	0.4517
1245	2.39							2.39	341.0	0.5876
1345	2.48							2.48	268.0	0.6944
1400	2.49							2.49	234.0	0.7504
1430	2.51							2.51	178.0	0.8071
1500	2.55							2.55	140.0	0.8741
1600	2.59							2.59	89.0	0.9308
1700	2.65							2.65	51.0	0.9633
1800	2.67							2.67	32.0	0.9838
1900	2.69							2.69	14.0	0.9927
2000	2.76							2.76	8.0	0.9980
2105	2.88							2.88	14.0	1.0069
2200	2.88							2.88	7.5	1.0139
2400	2.89							2.89	4.2	1.0166

STA. NO. 08178555 — STORM RAINFALL AND RUNOFF RECORD — 1979 WATER YEAR

HARLANDALE CREEK AT WEST HARDING BLVD., SAN ANTONIO, TX. — STORM OF JUNE 5, 1979

DATE & TIME	G A G E N U M B E R							ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN CFS	ACCUM. RUNOFF IN.
	1-RR									
JUN 5										
0000	0.0							0.0	0.0	0.0
0255	0.0							0.0	0.0	0.0
0300	0.01							0.01	0.0	0.0
0400	0.12							0.12	0.0	0.0
0405	0.23							0.23	0.0	0.0
0415	0.30							0.30	0.0	0.0
0430	0.45							0.45	0.0	0.0
0445	0.63							0.63	0.0	0.0
0500	0.69							0.69	0.0	0.0
0530	0.77							0.77	0.5	0.0001
0545	0.91							0.91	3.9	0.0007
0600	1.01							1.01	22.0	0.0042
0615	1.08							1.08	64.0	0.0145
0630	1.18							1.18	75.0	0.0264
0645	1.23							1.23	75.0	0.0384
0700	1.27							1.27	82.0	0.0580
0730	1.33							1.33	157.0	0.0913
0740	1.36							1.36	206.0	0.1187
0755	1.40							1.40	236.0	0.1814
0830	1.47							1.47	208.0	0.2533
0900	1.52							1.52	179.0	0.3389
1000	1.57							1.57	153.0	0.4364
1100	1.61							1.61	120.0	0.5130
1200	1.63							1.63	79.0	0.5885
1400	1.64							1.64	17.0	0.6048
1500	1.65							1.65	5.8	0.6085
1600	1.66							1.66	3.4	0.6107
1700	1.75							1.75	1.8	0.6115
1730	1.80							1.80	1.3	0.6118
1745	1.95							1.95	1.1	0.6120
1800	1.99							1.99	1.0	0.6122
1830	1.99							1.99	1.8	0.6128
1900	1.99							1.99	11.0	0.6163
1930	1.99							1.99	34.0	0.6272
2000	1.99							1.99	22.0	0.6377
2100	1.99							1.99	4.8	0.6408
2200	1.99							1.99	2.4	0.6423
2300	1.99							1.99	1.4	0.6432
2400	1.99							1.99	0.9	0.6435

STORM RAINFALL AND RUNOFF RECORD

1979 WATER YEAR

STA. NO. 08178554

HARLANDALE CREEK AT WEST HARDING BLVD., SAN ANTONIO, TX.   STORM OF JULY 5, 1979

DATE & TIME	GAGE NUMBER 1-WH								ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN CFS	ACCUM. RUNOFF IN.
JUL 5											
0000	0.0								0.0	0.0	0.0
0705	0.0								0.0	0.0	0.0
0710	0.01								0.01	0.0	0.0
0730	0.06								0.06	0.0	0.0
0800	0.12								0.12	0.0	0.0
0830	0.14								0.14	0.0	0.0
0900	0.46								0.46	0.0	0.0
0930	0.54								0.54	0.0	0.0
1000	0.68								0.68	2.7	0.0009
1030	0.75								0.75	5.8	0.0027
1100	0.91								0.91	9.7	0.0058
1130	1.04								1.04	22.0	0.0111
1145	1.13								1.13	48.0	0.0187
1200	1.18								1.18	101.0	0.0348
1215	1.21								1.21	153.0	0.0633
1235	1.22								1.22	175.0	0.1005
1255	1.22								1.22	169.0	0.1229
1300	1.22								1.22	167.0	0.1540
1330	1.22								1.22	148.0	0.2012
1400	1.22								1.22	110.0	0.2362
1430	1.22								1.22	68.0	0.2579
1500	1.22								1.22	33.0	0.2685
1530	1.22								1.22	13.0	0.2726
1600	1.22								1.22	4.5	0.2747
1700	1.22								1.22	1.4	0.2756
1800	1.22								1.22	0.6	0.2760
1900	1.22								1.22	0.0	0.2760
2400	1.22								1.22	0.0	0.2760

STA. NO. 08178645 STORM RAINFALL AND RUNOFF RECORD 1979 WATER YEAR

WEST ELM CREEK AT SAN ANTONIO, TX. STORM OF JAN 10, 1979

DATE & TIME	GAGE NUMBER 1F-5	2E-5	3E-5					ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN CFS	ACCUM. RUNOFF IN.
JAN 10										
0000	0.0	0.0	0.0					0.0	0.0	0.0
0500	0.0	0.0	0.0					0.0	0.0	0.0
0530	0.03	0.0	0.0					0.02	0.0	0.0
0600	0.04	0.0	0.01					0.02	0.0	0.0
0700	0.04	0.0	0.02					0.02	0.0	0.0
0800	0.06	0.0	0.03					0.04	0.0	0.0
0900	0.08	0.05	0.07					0.07	0.0	0.0
1000	0.11	0.07	0.11					0.09	0.0	0.0
1100	0.15	0.11	0.14					0.13	0.0	0.0
1200	0.25	0.23	0.24					0.24	0.0	0.0
1230	0.26	0.24	0.26					0.25	0.0	0.0
1300	0.34	0.30	0.32					0.32	0.0	0.0
1400	0.80	0.62	0.64					0.73	0.0	0.0
1430	1.05	0.96	0.92					1.01	0.0	0.0
1500	1.15	1.04	0.99					1.10	0.0	0.0
1530	1.25	1.14	1.12					1.20	0.0	0.0
1600	1.34	1.21	1.21					1.29	0.0	0.0
1615	1.34	1.21	1.21					1.29	0.0	0.0
1630	1.40	1.33	1.34					1.37	1.1	0.0003
1700	1.53	1.47	1.44					1.50	2.8	0.0011
1730	1.69	1.60	1.56					1.65	29.0	0.0103
1800	1.82	1.73	1.69					1.78	39.0	0.0227
1830	1.90	1.89	1.86					1.90	58.0	0.0410
1900	1.98	1.93	1.90					1.96	84.0	0.0631
1920	2.00	1.97	1.94					1.99	108.0	0.0973
2000	2.00	1.98	1.95					1.99	77.0	0.1257
2030	2.00	1.98	1.95					1.99	49.0	0.1412
2100	2.00	1.98	1.95					1.99	29.0	0.1549
2200	2.00	1.98	1.96					1.99	8.7	0.1604
2300	2.00	1.98	1.96					1.99	2.7	0.1622
2400	2.00	1.98	1.96					1.99	0.8	0.1624

STA. NO. 08178640 STORM RAINFALL AND RUNOFF RECORD 1979 WATER YEAR

WEST ELM CREEK AT SAN ANTONIO, TX. STORM OF JUNE 1, 1979

DATE & TIME	GAGE NUMBER							ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN CFS	ACCUM. RUNOFF IN.
	1E-S	2E-S	3E-S							
JUN 1										
0000	0.0	0.0	0.0					0.0	0.0	0.0
0905	0.0	0.01	0.0					0.00	0.0	0.0
0910	0.0	0.01	0.0					0.00	0.0	0.0
0915	0.01	0.01	0.0					0.01	0.0	0.0
0950	0.07	0.03	0.0					0.05	0.0	0.0
1010	0.12	0.03	0.0					0.08	0.0	0.0
1015	0.38	0.03	0.04					0.23	0.0	0.0
1020	0.54	0.17	0.44					0.39	0.0	0.0
1025	0.86	0.48	0.65					0.70	0.0	0.0
1030	1.10	0.63	0.97					0.91	0.0	0.0
1035	1.29	0.68	1.35					1.12	0.1	0.0000
1040	1.55	1.23	1.49					1.42	0.2	0.0000
1045	1.87	1.50	2.04					1.72	0.4	0.0000
1050	1.99	1.89	2.42					1.95	0.6	0.0001
1055	2.15	2.08	2.62					2.13	0.9	0.0001
1100	2.26	2.15	2.65					2.22	1.1	0.0003
1120	2.47	2.50	3.11					2.49	2.3	0.0007
1135	2.59	2.61	3.22					2.60	25.0	0.0046
1150	2.66	2.72	3.32					2.69	44.0	0.0116
1205	2.73	2.77	3.36					2.75	38.0	0.0156
1210	2.74	2.80	3.39					2.77	118.0	0.0249
1220	2.78	2.87	3.45					2.82	154.0	0.0412
1230	2.80	2.90	3.47					2.85	139.0	0.0815
1315	2.88	2.94	3.52					2.91	66.0	0.1075
1345	2.91	2.96	3.56					2.94	42.0	0.1208
1415	3.01	3.14	3.77					3.07	28.0	0.1385
1545	3.20	3.35	3.99					3.27	12.0	0.1480
1645	3.21	3.37	4.02					3.28	8.1	0.1557
1845	3.27	3.42	4.07					3.34	2.7	0.1600
2145	3.33	3.48	4.13					3.40	0.4	0.1606
2400	3.41	3.56	4.21					3.48	0.0	0.1606

STA. NO. 08178645 | STORM RAINFALL AND RUNOFF RECORD | 1979 WATER YEAR

EAST ELM CREEK AT SAN ANTONIO, TX. | STORM OF JAN. 10, 1979

DATE & TIME	GAGE NUMBER							ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN CFS	ACCUM. RUNOFF IN.
	1E-S	2E-S	3E-S							
JAN 10										
0000	0.0	0.0	0.0					0.0	0.0	0.0
0500	0.0	0.0	0.0					0.0	0.0	0.0
0530	0.03	0.0	0.0					0.02	0.0	0.0
0600	0.04	0.0	0.01					0.03	0.0	0.0
0700	0.04	0.0	0.02					0.03	0.0	0.0
0800	0.06	0.0	0.03					0.04	0.0	0.0
0900	0.08	0.05	0.07					0.07	0.0	0.0
1000	0.11	0.07	0.11					0.11	0.0	0.0
1100	0.15	0.11	0.14					0.14	0.0	0.0
1200	0.25	0.23	0.24					0.24	0.0	0.0
1230	0.26	0.24	0.26					0.25	0.0	0.0
1300	0.34	0.30	0.32					0.33	0.0	0.0
1400	0.80	0.62	0.64					0.75	0.0	0.0
1430	1.05	0.96	0.92					0.99	0.0	0.0
1500	1.15	1.04	0.99					1.08	0.0	0.0
1600	1.34	1.21	1.21					1.26	0.0	0.0
1700	1.53	1.47	1.44					1.49	0.0	0.0
1800	1.82	1.73	1.69					1.76	0.0	0.0
1805	1.85	1.73	1.71					1.79	2.9	0.0002
1815	1.88	1.83	1.79					1.84	32.0	0.0047
1830	1.90	1.89	1.86					1.88	64.0	0.0153
1845	1.94	1.91	1.88					1.92	77.0	0.0261
1900	1.98	1.93	1.90					1.95	86.0	0.0424
1915	2.00	1.97	1.94					1.98	93.0	0.0527
1920	2.00	1.97	1.94					1.98	95.0	0.0606
1930	2.00	1.97	1.95					1.98	99.0	0.0716
1940	2.00	1.97	1.95					1.98	101.0	0.0884
2000	2.00	1.98	1.95					1.98	96.0	0.1070
2015	2.00	1.98	1.95					1.98	91.0	0.1221
2030	2.00	1.98	1.96					1.98	83.0	0.1428
2100	2.00	1.98	1.96					1.98	68.0	0.1768
2200	2.00	1.98	1.96					1.98	39.0	0.2027
2300	2.00	1.98	1.96					1.98	14.0	0.2112
2350	2.00	1.98	1.96					1.98	2.9	0.2121
2355	2.00	1.98	1.96					1.98	0.0	0.2121
2400	2.00	1.98	1.96					1.98	0.0	0.2121

STA. NO. 08178645 STORM RAINFALL AND RUNOFF RECORD 1979 WATER YEAR

EAST ELM CREEK AT SAN ANTONIO, TX. STORM OF JUNE 1, 1979

DATE & TIME	GAGE NUMBER							ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN CFS	ACCUM. RUNOFF IN.
	1E-S	2E-S	3E-S							
JUN 1										
0000	0.0	0.0	0.0					0.0	0.0	0.0
0815	0.0	0.0	0.0					0.0	0.0	0.0
0820	0.0	0.01	0.0					0.00	0.0	0.0
0825	0.01	0.01	0.0					0.01	0.0	0.0
0900	0.07	0.03	0.0					0.04	0.0	0.0
0920	0.12	0.03	0.0					0.07	0.0	0.0
0925	0.30	0.03	0.04					0.23	0.0	0.0
0930	0.54	0.17	0.44					0.48	0.0	0.0
0935	0.86	0.40	0.65					0.75	0.0	0.0
0940	1.10	0.63	0.97					1.02	0.0	0.0
0945	1.29	0.88	1.35					1.28	0.0	0.0
0950	1.55	1.23	1.64					1.58	0.0	0.0
0955	1.87	1.50	2.04					1.91	0.0	0.0
1000	1.99	1.89	2.42					2.15	0.0	0.0
1005	2.15	2.08	2.62					2.32	0.0	0.0
1010	2.26	2.15	2.65					2.40	0.0	0.0
1020	2.35	2.27	2.92					2.56	0.0	0.0
1030	2.47	2.50	3.11					2.72	37.0	0.0051
1045	2.59	2.61	3.22					2.83	67.0	0.0144
1055	2.63	2.68	3.31					2.89	71.0	0.0203
1100	2.66	2.72	3.32					2.91	69.0	0.0356
1135	2.78	2.87	3.45					3.04	67.0	0.0579
1200	2.84	2.92	3.49					3.09	67.0	0.0746
1220	2.86	2.93	3.50					3.11	67.0	0.0857
1230	2.88	2.94	3.52					3.13	67.0	0.1006
1300	2.91	2.96	3.56					3.16	68.0	0.1232
1330	3.01	3.14	3.77					3.31	61.0	0.1435
1400	3.13	3.26	3.89					3.43	52.0	0.1565
1415	3.16	3.29	3.92					3.46	47.0	0.1721
1500	3.20	3.35	3.99					3.51	32.0	0.1907
1600	3.21	3.37	4.02					3.53	15.0	0.2057
1800	3.27	3.42	4.07					3.58	0.0	0.2057
2100	3.33	3.48	4.13					3.64	0.0	0.2057
2400	3.41	3.56	4.21					3.72	0.0	0.2057

STA. NO. 08178690 | STORM RAINFALL AND RUNOFF RECORD | 1979 WATER YEAR

SALADO CREEK TRIBUTARY AT RITTERS ROAD, SAN ANTONIO, TX. STORM OF NOV. 26, 1978

DATE & TIME	GAGE NUMBER							ACCUM. WEIGHTED PRECIP.	DISCHARGE IN	ACCUM. RUNOFF
	3-S							IN.	CFS	IN.
NOV 26										
0000	0.0							0.0	0.0	0.0
0520	0.0							0.0	0.0	0.0
0530	0.07							0.07	0.0	0.0
0535	0.21							0.21	0.0	0.0
0545	0.35							0.35	0.0	0.0
0550	0.47							0.47	9.6	0.0048
0555	0.61							0.61	18.0	0.0137
0600	0.75							0.75	31.0	0.0291
0605	0.77							0.77	62.0	0.0599
0610	0.77							0.77	64.0	0.0917
0615	0.77							0.77	55.0	0.1463
0630	0.77							0.77	34.0	0.1970
0645	0.77							0.77	23.0	0.2312
0700	0.77							0.77	18.0	0.2581
0715	0.80							0.80	15.0	0.2767
0725	0.90							0.90	14.0	0.2871
0730	1.15							1.15	17.0	0.2956
0735	1.62							1.62	52.0	0.3214
0740	1.85							1.85	161.0	0.4014
0745	1.87							1.87	190.0	0.4957
0750	1.92							1.92	148.0	0.5692
0755	1.92							1.92	119.0	0.6283
0800	1.92							1.92	88.0	0.7157
0815	1.92							1.92	47.0	0.7858
0830	1.92							1.92	30.0	0.8305
0845	1.92							1.92	23.0	0.8647
0900	1.92							1.92	19.0	0.9072
0930	1.92							1.92	15.0	0.9519
1000	1.92							1.92	11.0	1.0339
1200	1.92							1.92	7.0	1.0964
1300	1.92							1.92	5.0	1.1473
1525	1.92							1.92	2.8	1.2057
2000	1.92							1.92	1.0	1.2313
2400	1.92							1.92	0.0	1.2313

STA. NO. 08178690 STORM RAINFALL AND RUNOFF RECORD 1979 WATER YEAR

SALADO CREEK TRIBUTARY AT BITTERS ROAD, SAN ANTONIO, TX. STORM OF MARCH 15, 1979

DATE & TIME	GAGE NUMBER							ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN CFS	ACCUM. RUNOFF IN.
	3-S									
MAR 15										
0000	0.0							0.0	0.0	0.0
0945	0.0							0.0	0.0	0.0
0950	0.02							0.02	0.0	0.0
0955	0.17							0.17	0.0	0.0
1000	0.19							0.19	0.0	0.0
1015	0.34							0.34	0.0	0.0
1020	0.43							0.43	13.0	0.0097
1030	0.68							0.68	57.0	0.0521
1035	0.74							0.74	60.0	0.0819
1040	0.77							0.77	68.0	0.1157
1045	0.81							0.81	60.0	0.1753
1100	0.90							0.90	44.0	0.2409
1115	0.90							0.90	29.0	0.2841
1130	0.90							0.90	21.0	0.3206
1150	0.90							0.90	14.0	0.3623
1230	0.90							0.90	9.9	0.3967
1300	0.90							0.90	9.6	0.4396
1400	0.90							0.90	9.0	0.5737
1800	0.90							0.90	5.0	0.6780
2100	0.90							0.90	3.0	0.7317
2400	0.90							0.90	2.0	0.7496

STA. NO. 08178690 STORM RAINFALL AND RUNOFF RECORD 1979 WATER YEAR

SALADO CREEK TRIBUTARY AT BITTERS ROAD, SAN ANTONIO, TX. STORM OF APRIL 29, 1979

DATE & TIME	GAGE NUMBER 3-S							ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN CFS	ACCUM. RUNOFF IN.
APR 29										
0000	0.0							0.0	0.0	0.0
0650	0.0							0.0	0.0	0.0
0655	0.0							0.0	16.0	0.0079
0700	0.0							0.0	26.0	0.0209
0705	0.0							0.0	56.0	0.0487
0710	0.0							0.0	68.0	0.0824
0715	0.01							0.01	77.0	0.1398
0725	0.11							0.11	81.0	0.2002
0730	0.15							0.15	80.0	0.2598
0740	0.29							0.29	74.0	0.3149
0745	0.39							0.39	68.0	0.3487
0750	0.56							0.56	63.0	0.3956
0800	0.78							0.78	50.0	0.4328
0805	0.91							0.91	43.0	0.4542
0810	1.02							1.02	38.0	0.4731
0815	1.10							1.10	33.0	0.4977
0825	1.31							1.31	26.0	0.5170
0830	1.34							1.34	23.0	0.5342
0840	1.42							1.42	19.0	0.5483
0845	1.42							1.42	18.0	0.5662
0900	1.42							1.42	14.0	0.6183
1000	1.42							1.42	10.0	0.6779
1100	1.42							1.42	7.0	0.7110
1135	1.46							1.46	5.0	0.7408
1300	1.46							1.46	3.0	0.7624
1400	1.46							1.46	1.0	0.7713
1600	1.46							1.46	0.0	0.7713
2400	1.46							1.46	0.0	0.7713

STA. NO. 08178690 STORM RAINFALL AND RUNOFF RECORD 1979 WATER YEAR

SALADO CREEK TRIBUTARY AT RITTERS ROAD, SAN ANTONIO, TX. STORM OF JUNE 1, 1979

DATE & TIME	GAGE NUMBER							ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN CFS	ACCUM. RUNOFF IN.
	3-5									
JUN 1										
0000	0.0							0.0	0.0	0.0
0915	0.09							0.09	0.0	0.0
0930	0.21							0.21	0.0	0.0
0940	0.28							0.28	9.0	0.0067
0945	0.55							0.55	16.0	0.0147
0950	0.81							0.81	30.0	0.0296
0955	0.90							0.90	66.0	0.0623
1000	0.99							0.99	72.0	0.1339
1015	1.16							1.16	58.0	0.1915
1020	1.42							1.42	62.0	0.2223
1025	1.76							1.76	78.0	0.2610
1030	1.97							1.97	112.0	0.3166
1035	2.10							2.10	139.0	0.3857
1040	2.22							2.22	130.0	0.4502
1045	2.31							2.31	119.0	0.5389
1055	2.51							2.51	102.0	0.6149
1100	2.60							2.60	96.0	0.7102
1115	2.70							2.70	74.0	0.8205
1130	2.81							2.81	55.0	0.9434
1200	2.86							2.86	33.0	1.0909
1300	2.94							2.94	17.0	1.1542
1315	3.16							3.16	20.0	1.1840
1330	3.18							3.18	29.0	1.2489
1400	3.25							3.25	21.0	1.3427
1500	3.42							3.42	20.0	1.5215
1700	3.47							3.47	10.0	1.6705
2000	3.57							3.57	9.6	1.7921
2115	3.60							3.60	9.3	1.8545
2215	3.67							3.67	4.6	1.8922
2400	3.67							3.67	1.0	1.8974

STA. NO. 08178690 STORM RAINFALL AND RUNOFF RECORD 1979 WATER YEAR

SALADO CREEK TRIBUTARY AT BITTERS ROAD, SAN ANTONIO, TX. STORM OF JULY 5, 1979

DATE & TIME	GAGE NUMBER							ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN CFS	ACCUM. RUNOFF IN.
	3-S									
JUL 5										
0000	0.0							0.0	0.0	0.0
0735	0.0							0.0	0.0	0.0
0745	0.02							0.02	0.0	0.0
0800	0.03							0.03	0.0	0.0
0830	0.17							0.17	0.0	0.0
0840	0.45							0.45	9.0	0.0067
0845	0.61							0.61	12.0	0.0127
0850	0.67							0.67	14.0	0.0196
0855	0.70							0.70	17.0	0.0281
0900	0.71							0.71	44.0	0.0499
0905	0.74							0.74	55.0	0.0772
0910	0.76							0.76	51.0	0.1026
0915	0.77							0.77	43.0	0.1239
0920	0.78							0.78	38.0	0.1428
0925	0.79							0.79	34.0	0.1597
0930	0.80							0.80	30.0	0.1895
0945	0.82							0.82	23.0	0.2237
1000	0.90							0.90	19.0	0.2945
1100	1.09							1.09	19.0	0.3794
1130	1.16							1.16	18.0	0.4599
1230	1.40							1.40	17.0	0.5359
1300	1.47							1.47	17.0	0.6625
1500	1.47							1.47	9.3	0.8288
1900	1.47							1.47	4.0	0.9063
2130	1.47							1.47	0.0	0.9063
2400	1.47							1.47	0.0	0.9063

STA. NO. 08181000 STORM RAINFALL AND RUNOFF RECORD 1979 WATER YEAR

LEON CREEK TRIB. AT FARM ROAD 1604, SAN ANTONIO, TX. STORM OF NOV. 5,1978

DATE & TIME	GAGE NUMBER							ACCUM. WEIGHTED PRECIP.	DISCHARGE IN	ACCUM. RUNOFF
	1-L	2-L						IN.	CFS	IN.
NOV 5										
0000	0.0	0.0						0.0	0.0	0.0
0430	0.0	0.0						0.0	0.0	0.0
1000	0.07	0.01						0.06	0.0	0.0
1030	0.15	0.04						0.12	0.0	0.0
1100	0.18	0.06						0.15	0.0	0.0
1130	0.27	0.15						0.24	0.0	0.0
1200	0.48	0.32						0.44	0.0	0.0
1230	0.88	0.44						0.78	0.0	0.0
1300	1.05	0.50						0.92	0.0	0.0
1330	1.26	0.76						1.14	0.0	0.0
1400	1.60	1.08						1.48	0.0	0.0
1425	1.96	1.49						1.85	0.0	0.0
1430	2.02	1.54						1.91	69.0	0.0056
1500	2.40	1.96						2.30	86.0	0.0176
1530	2.44	1.97						2.33	69.0	0.0272
1600	2.46	2.01						2.36	54.0	0.0347
1630	2.55	2.20						2.47	46.0	0.0411
1700	2.98	2.53						2.88	50.0	0.0480
1730	3.23	2.78						3.13	80.0	0.0592
1800	3.42	3.15						3.36	93.0	0.0721
1830	3.51	3.31						3.46	86.0	0.0841
1900	3.54	3.35						3.50	73.0	0.0942
1930	3.56	3.37						3.52	60.0	0.1026
2000	3.57	3.39						3.53	45.0	0.1088
2030	3.57	3.39						3.53	34.0	0.1135
2100	3.57	3.39						3.53	27.0	0.1192
2200	3.57	3.39						3.53	21.0	0.1279
2400	3.57	3.39						3.53	14.0	0.1318

STA. NO. 08181000

STORM RAINFALL AND RUNOFF RECORD

1979 WATER YEAR

LEON CREEK TRIB. AT FARM ROAD 1604, SAN ANTONIO, TX.

STORM OF DEC. 31, 1978

DATE & TIME	GAGE NUMBER 1-L	2-L						ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN CFS	ACCUM. RUNOFF IN.
DEC 31										
0000	0.0	0.0						0.0	0.0	0.0
0035	0.0	0.0						0.0	0.0	0.0
0100	0.02	0.01						0.02	0.0	0.0
0115	0.24	0.03						0.19	0.0	0.0
0130	0.51	0.11						0.42	0.0	0.0
0200	0.74	0.19						0.61	0.0	0.0
0230	0.89	0.21						0.73	0.0	0.0
0300	0.98	0.22						0.81	0.0	0.0
0330	1.17	0.23						0.95	0.0	0.0
0400	1.39	0.30						1.14	0.0	0.0
0430	1.42	0.63						1.24	0.0	0.0
0500	1.48	0.65						1.29	0.0	0.0
0530	1.48	0.77						1.32	0.0	0.0
0600	1.48	0.83						1.33	0.0	0.0
0615	1.48	1.03						1.38	0.0	0.0
0630	1.48	1.33						1.45	0.0	0.0
0645	1.48	1.52						1.49	84.0	0.0049
0655	1.48	1.54						1.49	86.0	0.0079
0700	1.48	1.55						1.50	84.0	0.0147
0730	1.48	1.60						1.51	69.0	0.0243
0800	1.48	1.66						1.52	60.0	0.0326
0830	1.48	1.66						1.52	56.0	0.0404
0900	1.48	1.66						1.52	46.0	0.0468
0930	1.48	1.66						1.52	44.0	0.0529
1000	1.48	1.67						1.52	27.0	0.0648
1240	1.48	1.67						1.52	15.0	0.0706
1245	1.48	1.68						1.53	14.0	0.0732
1400	1.48	1.68						1.53	11.0	0.0820
1830	1.48	1.68						1.53	0.0	0.0820
2230	1.48	1.68						1.53	0.0	0.0820
2300	1.69	1.68						1.69	0.0	0.0820
2330	1.72	1.68						1.71	0.0	0.0820
2400	1.77	1.68						1.75	0.0	0.0820

STA. NO. 08181000 STORM RAINFALL AND RUNOFF RECORD 1979 WATER YEAR

LEON CREEK TRIB. AT FARM ROAD 1604, SAN ANTONIO, TX. STORM OF JAN. 10, 1979

DATE & TIME	GAGE NUMBER							ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN CFS	ACCUM. RUNOFF IN.
	1-L	2-L								
JAN 10										
0000	0.0	0.0						0.0	0.0	0.0
0655	0.0	0.0						0.0	0.0	0.0
0700	0.07	0.01						0.06	0.0	0.0
0800	0.12	0.05						0.10	0.0	0.0
0900	0.16	0.07						0.14	0.0	0.0
0930	0.17	0.08						0.15	0.0	0.0
1000	0.21	0.10						0.18	0.0	0.0
1100	0.25	0.15						0.23	0.0	0.0
1130	0.30	0.18						0.27	0.0	0.0
1200	0.45	0.30						0.42	0.0	0.0
1230	0.58	0.41						0.54	0.0	0.0
1300	0.61	0.42						0.57	0.0	0.0
1330	0.71	0.60						0.68	0.0	0.0
1400	0.85	0.67						0.81	0.0	0.0
1430	0.90	0.77						0.87	0.0	0.0
1500	1.02	0.85						0.98	0.0	0.0
1600	1.22	1.04						1.18	0.0	0.0
1700	1.42	1.28						1.39	0.0	0.0
1730	1.52	1.42						1.50	56.0	0.0078
1800	1.62	1.50						1.59	58.0	0.0159
1830	1.62	1.64						1.62	60.0	0.0221
1845	1.70	1.65						1.69	58.0	0.0262
1900	1.70	1.65						1.69	60.0	0.0366
2000	1.70	1.65						1.69	52.0	0.0511
2100	1.70	1.65						1.69	44.0	0.0694
2300	1.70	1.66						1.69	29.0	0.0815
2400	1.70	1.66						1.69	19.0	0.0842

STA. NO. 08181000 STORM RAINFALL AND RUNOFF RECORD 1979 WATER YEAR

LEON CREEK TRIB AT FARM ROAD 1604, SAN ANTONIO, TX. STORM OF MARCH 20-21, 1979

DATE & TIME	GAGE NUMBER 1-L	2-L						ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN CFS	ACCUM. RUNOFF IN.
MAR 20										
0000	0.0	0.0						0.0	0.0	0.0
1900	0.03	0.04						0.03	0.0	0.0
1930	0.09	0.08						0.09	0.0	0.0
2000	0.10	0.08						0.10	0.0	0.0
2030	0.11	0.08						0.10	0.0	0.0
2100	0.37	0.49						0.40	0.0	0.0
2105	0.75	0.92						0.79	0.0	0.0
2110	0.95	1.21						1.01	0.0	0.0
2115	1.20	1.42						1.25	0.0	0.0
2130	1.37	1.53						1.41	128.0	0.0134
2200	1.40	1.55						1.43	143.0	0.0432
2300	1.42	1.56						1.45	140.0	0.0724
2330	1.42	1.56						1.45	136.0	0.0913
2400	1.75	1.97						1.80	133.0	0.1052
MAR 21										
0000	1.75	1.97						1.80	133.0	0.1052
0030	2.00	2.09						2.02	133.0	0.1237
0045	2.00	2.13						2.03	132.0	0.1329
0100	2.21	2.70						2.32	132.0	0.1421
0115	2.21	2.71						2.32	143.0	0.1520
0130	2.21	2.71						2.32	227.0	0.1678
0145	2.21	2.71						2.32	238.0	0.1843
0200	2.21	2.71						2.32	242.0	0.2096
0230	2.21	2.71						2.32	212.0	0.2391
0300	2.21	2.71						2.32	201.0	0.2577
0310	2.33	2.72						2.42	198.0	0.2853
0400	2.33	2.72						2.42	139.0	0.3207
0500	2.33	2.72						2.42	80.0	0.3430
0600	2.33	2.72						2.42	40.0	0.3541
0700	2.33	2.72						2.42	22.0	0.3633
0900	2.33	2.72						2.42	10.0	0.3702
1200	2.33	2.72						2.42	0.0	0.3702
2400	2.33	2.72						2.42	0.0	0.3702

GUADALUPE RIVER BASIN

08177700 OLMOS CREEK AT DRESDEN DRIVE, SAN ANTONIO, TX

LOCATION.--Lat 29°29'56", long 98°30'36", Bexar County, Hydrologic Unit 12100301, on right bank 30 ft (9 m) downstream from low-water bridge on Dresden Drive at San Antonio, 0.15 mi (0.24 km) west of intersection of Blanco Road and Dresden Drive, and 4.0 mi (6.4 km) upstream from Olmos Dam.

DRAINAGE AREA.--21.2 mi^2 (54.9 km^2).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1968 to current year.

GAGE.--Water-stage recorder. Datum of gage is 726.10 ft (221.315 m) National Geodetic Vertical Datum of 1929.

REMARKS.--Water-discharge records good. Recording rain gage located at station, with three additional recording rain gages located in watershed. City of San Antonio rain gage and gage-height telemeters at station.

AVERAGE DISCHARGE.--12 years, 4.38 ft^3/s (0.124 m^3/s), 2.81 in/yr (71 mm/yr), 3,170 acre-ft/yr (3.91 hm^3/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,450 ft^3/s (211 m^3/s) Sept. 13, 1978, gage height, 14.82 ft (4.517 m), from floodmark; no flow at times.
Maximum stage since 1935, that of Sept. 13, 1978.

EXTREMES OUTSIDE PERIOD OF RECORD.--Floods in September and November 1947 reached a stage of 8.5 ft (2.59 m), from information by local resident.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 400 ft^3/s (11.3 m^3/s) and maximum (*):

Date	Time	Discharge (ft^3/s)	Discharge (m^3/s)	Gage height (ft)	Gage height (m)
aDec. 28	1800	*553	15.7	6.23	1.899
Sept. 7	1745	479	13.6	6.01	1.832

a Water-quality samples were obtained during this runoff event.

Minimum discharge, no flow at times.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.08	.06	.08	.33	.15	.09	.30	10	.02	.08	.00	.26
2	.40	.06	.08	.15	.31	.09	.27	4.9	.02	.10	.01	.00
3	.08	.06	.08	.25	.17	.14	.30	.82	.01	.12	.12	.00
4	.03	.08	.08	.11	.15	.19	.24	.54	.01	.12	.08	.02
5	.03	.19	.08	.11	.15	.21	.23	.52	.00	.15	.06	.02
6	.03	.06	.15	.13	.15	.18	.20	.45	.01	.15	.17	14
7	.04	.06	.15	.10	.15	.22	.22	.50	.01	.16	.06	103
8	.05	.06	.13	.08	.25	.20	.18	11	.00	.20	.10	7.8
9	.04	.06	.14	.10	.16	.14	.22	1.4	.00	.20	1.9	.88
10	.02	.06	.22	.13	.11	.16	.15	.72	.00	.23	58	.54
11	.03	.06	.15	.11	.11	.09	.17	.79	.02	.23	15	.31
12	.05	.06	.66	.13	.11	.10	.66	.71	.02	.20	.19	.32
13	.05	.06	4.8	.16	.11	.14	1.1	19	.02	.19	.17	.30
14	.08	.06	.40	.15	.15	.13	.25	46	.02	.18	.15	.34
15	.08	.06	.33	.15	.11	.09	.25	61	.02	.14	.13	.34
16	.08	.05	.22	.15	3.3	.11	.25	21	.03	.17	.22	.34
17	.06	.05	.20	.42	.09	.13	.24	14	.04	.15	.06	.38
18	.06	.83	.25	.22	.08	.16	.23	8.6	.03	.15	.04	.28
19	.06	.08	.25	.20	.08	.23	.25	22	.03	.18	.05	28
20	.06	.08	.25	.41	.08	.40	.29	.31	.04	.15	.03	1.3
21	.06	.83	.25	.18	.08	.11	.25	20	.44	.15	.09	.49
22	.06	.09	.25	1.6	.08	.11	.28	.62	.07	31	.02	.44
23	.06	.08	.95	.28	.09	.15	.31	.12	.04	2.1	.05	.38
24	.06	.51	.27	.24	.08	.17	.31	1.1	.04	.30	.03	.32
25	.06	.54	.25	.23	.10	.15	15	.07	.06	.15	.03	.33
26	.06	.20	.25	.20	.11	.30	.82	.06	.06	.15	.02	1.6
27	.23	.15	.25	.16	.12	3.9	.43	.06	.06	.11	.02	11
28	.20	.11	86	.15	.11	1.5	.38	.05	.06	.11	.02	1.8
29	.08	.08	12	.15	.12	.26	.41	.04	.04	.10	.03	.48
30	.08	.08	.31	.15	---	.21	.39	.03	.05	.04	.00	3.1
31	.08	---	.25	.15	---	.20	---	.03	---	.02	.10	---
TOTAL	2.44	4.81	109.73	7.08	6.86	10.26	24.58	246.44	1.27	37.48	76.95	178.37
MEAN	.079	.16	3.54	.23	.24	.33	.82	7.95	.042	1.21	2.48	5.95
MAX	.40	.83	86	1.6	3.3	3.9	15	61	.44	31	58	103
MIN	.02	.05	.08	.08	.08	.09	.15	.03	.00	.02	.00	.00
CFSM	.004	.008	.17	.01	.01	.02	.04	.38	.002	.06	.12	.28
IN.	.00	.01	.19	.01	.01	.02	.04	.43	.00	.07	.14	.31
AC-FT	4.8	9.5	218	14	14	20	49	489	2.5	74	153	354
(††)	.06	.61	2.68	.48	.79	1.12	1.85	7.58	.16	.74	2.78	6.29

CAL YR 1979 TOTAL 1470.67 MEAN 4.03 MAX 243 MIN .00 CFSM .19 IN 2.58 AC-FT 2920 †† 29.40
WTR YR 1980 TOTAL 706.27 MEAN 1.93 MAX 103 MIN .00 CFSM .09 IN 1.24 AC-FT 1400 †† 2[illegible]

†† Weighted-mean rainfall, in inches.

08177700 OLMOS CREEK AT DRESDEN DRIVE, SAN ANTONIO, TX--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical, biochemical, and pesticide analyses: November 1968 to current year. Sediment analyses: October 1972 to September 1973. Water temperatures: November 1968 to current year. Bacteria analyses: April 1976 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	COLOR (PLAT-INUM COBALT UNITS)	TUR-BID-ITY (NTU)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)	OXYGEN DEMAND, BIOCHEM UNINHIB 5 DAY (MG/L)
DEC										
28...	1608	37	290	7.9	16.0	5	160	9.0	92	8.5
28...	1812	507	99	8.4	14.5	80	1100	9.6	95	6.7
28...	2020	236	111	8.5	13.5	100	500	9.7	94	7.6
31...	1108	.25	572	7.2	9.5	10	4.3	10.1	89	1.7

DATE	COLI-FORM, TOTAL, IMMED. (COLS. PER 100 ML)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO
DEC									
28...	110000	50000	56000	160	25	56	3.9	17	.6
28...	K140000	K24000	112000	40	4	14	1.2	3.1	.2
28...	K72000	K17000	72000	42	0	16	.4	3.8	.3
31...	8000	K3400	4800	230	43	84	5.4	27	.8

DATE	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	BICAR-BONATE (MG/L AS HCO3)	CAR-BONATE (MG/L AS CO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	SOLIDS, RESIDUE AT 105 DEG. C, SUS-PENDED (MG/L)
DEC									
28...	3.4	160	0	30	14	.2	9.3	213	230
28...	3.4	42	1	6.6	3.4	.1	3.0	57	1610
28...	3.7	52	<1	7.9	4.3	.1	3.9	66	628
31...	4.0	230	0	60	30	.3	15	339	6

DATE	SOLIDS, VOLA-TILE, SUS-PENDED (MG/L)	NITRO-GEN, NITRATE TOTAL (MG/L AS N)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS-PHORUS, TOTAL (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)
DEC									
28...	39	.24	.020	.26	.110	1.9	2.0	.250	21
28...	198	.39	.140	.53	.400	2.1	2.5	1.100	52
28...	84	.40	.120	.52	.430	1.4	1.8	.760	22
31...	4	.60	.030	.63	.020	.72	.74	.060	7.8

DATE	TIME	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, DIS-SOLVED (UG/L AS FE)
DEC							
28...	1608	1	50	<1	0	0	320
28...	1812	1	20	<1	0	0	40
28...	2020	1	10	<1	0	0	30

DATE	LEAD, DIS-SOLVED (UG/L AS PB)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MERCURY DIS-SOLVED (UG/L AS HG)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	ZINC, DIS-SOLVED (UG/L AS ZN)
DEC						
28...	24	40	.0	0	0	20
28...	4	3	.0	0	0	<3
28...	4	4	.1	0	0	20

GUADALUPE RIVER BASIN

08177700 OLMOS CREEK AT DRESDEN DRIVE, SAN ANTONIO, TX--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	TIME	PCB TOTAL (UG/L)	NAPH-THA-LENES, POLY-CHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)	CHLOR-DANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DI-AZINON, TOTAL (UG/L)
DEC									
28...	1608	.00	.00	.00	.0	.00	.00	.00	.04
28...	1812	.00	.00	.00	.1	.00	.00	.01	.36

DATE	DI-ELDRIN TOTAL (UG/L)	ENDO-SULFAN, TOTAL (UG/L)	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTA-CHLOR, TOTAL (UG/L)	HEPTA-CHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALA-THION, TOTAL (UG/L)	METH-OXY-CHLOR, TOTAL (UG/L)
DEC									
28...	.00	.00	.00	.00	.01	.00	.00	.00	.00
28...	.00	.00	.00	.00	.02	.00	.00	.01	.00

DATE	METHYL PARA-THION, TOTAL (UG/L)	METHYL TRI-THION, TOTAL (UG/L)	MIREX, TOTAL (UG/L)	PARA-THION, TOTAL (UG/L)	TOX-APHENE, TOTAL (UG/L)	TOTAL TRI-THION (UG/L)	2,4-D, TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)	SILVEX, TOTAL (UG/L)
DEC									
28...	.00	.00	.00	.00	0	.00	.01	.01	.01
28...	.01	.00	.00	.00	0	.00	.01	.01	.00

GUADALUPE RIVER BASIN

08178000 SAN ANTONIO RIVER AT SAN ANTONIO, TX

LOCATION.--Lat 29°24'34", long 98°29'41", Bexar County, Hydrologic Unit 12100301, on left bank 193 ft (59 m) downstream from South Alamo Street Bridge in San Antonio, 2.1 mi (3.4 km) upstream from San Pedro Creek, and 230.6 mi (371.1 km) upstream from mouth.

DRAINAGE AREA.--41.8 mi^2 (108.3 km^2). Flow of river comes from intermittent spring flow and from artesian wells; drainage area of streams not applicable.

PERIOD OF RECORD.--December 1895 to June 1906 periodic discharge measurements only. January 1915 to November 1929, February 1939 to current year. Ground-water discharge into river is discussed by Petit and George, Texas Board of Water Engineers Bull. 5608, vol. 1 (1956, p. 45).

Water-quality records: Chemical, biochemical, and pesticide analyses: November 1968 to September 1979. Sediment analyses: May 1970 to September 1973. Water temperatures: November 1968 to September 1979. Bacteria analyses: May 1976 to September 1979.

REVISED RECORDS.--WSP 1312: 1917. WSP 1923: Drainage area. WRD TX-72-1: 1971(m).

GAGE.--Water-stage recorder and concrete control. Datum of gage is 605.26 ft (184.483 m) National Geodetic Vertical Datum of 1929. Jan. 26, 1915, to Feb. 27, 1916, nonrecording gage at site 1.3 mi (2.1 km) upstream at different datum. Feb. 28, 1916, to Apr. 7, 1920, nonrecording gage at site 1.1 mi (1.8 km) upstream at different datum. Apr. 8, 1920, to Nov. 16, 1929, and Feb. 15, 1939, to Apr. 25, 1967, water-stage recorder in vicinity of South Alamo Street Bridge at 7.00-foot (2.134 m) higher datum. Apr. 25, 1967, to May 13, 1969, water-stage recorder at site 307 ft (94 m) downstream at same datum.

REMARKS.--Records good. Floodflow is regulated by Olmos flood-control reservoir, capacity 14,240 acre-ft (17.6 hm^3), revised, about 8.5 mi (13.7 km) upstream. Dam completed in 1926 and rebuilt in 1980. Springs emerge intermittently from the Edwards and associated limestones along the Balcones Fault Zone. City of San Antonio rain gage and gage-height telemeters at station.

AVERAGE DISCHARGE.--55 years, 55.8 ft^3/s (1.580 m^3/s), 18.13 in/yr (461 mm/yr), 40,430 acre-ft/yr (49.9 hm^3/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 15,300 ft^3/s (433 m^3/s) Sept. 10, 1921, gage height, 20.14 ft (6.139 m), from floodmark, at former site and datum, from rating curve extended above 2,000 ft^3/s (56.6 m^3/s) on basis of slope-area measurement of peak flow; no flow at times due to regulation.

Maximum stage since 1819, that of Sept. 10, 1921.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 5, 1819, equaled or exceeded that of Sept. 10, 1921.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,440 ft^3/s (69.1 m^3/s) May 1 at 1845 hours, gage height, 11.23 ft (3.423 m); minimum daily, 0.86 ft^3/s (0.024 m^3/s) May 5, due to regulation.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	54	33	57	63	54	27	18	148	23	13	15	15
2	56	44	60	68	57	27	21	40	20	12	15	22
3	51	47	70	68	57	29	22	26	16	12	14	16
4	48	48	58	68	55	29	20	8.8	17	10	16	16
5	47	46	57	68	52	28	21	.86	13	11	16	16
6	46	46	46	68	51	25	19	23	14	11	15	148
7	44	48	56	67	51	24	21	10	12	12	28	416
8	44	51	58	66	60	23	16	55	11	11	26	142
9	44	49	58	66	56	21	16	17	22	13	26	15
10	58	47	59	66	50	23	20	16	13	11	240	7.1
11	45	48	60	66	50	20	24	14	7.1	13	99	12
12	45	48	77	62	51	21	18	31	3.4	12	14	13
13	44	50	128	63	49	18	27	82	10	12	18	12
14	43	48	56	63	49	19	18	191	11	11	18	12
15	46	47	57	62	49	20	17	241	9.8	12	18	13
16	46	44	57	62	78	20	16	88	11	13	19	14
17	44	80	45	61	41	22	16	80	9.3	13	17	11
18	43	60	54	61	43	19	11	67	11	16	17	13
19	42	43	57	60	42	19	3.7	168	9.7	13	16	21
20	41	55	58	79	55	20	12	31	10	11	16	15
21	63	75	58	64	27	18	11	198	11	14	19	9.5
22	32	57	58	84	36	18	15	44	9.4	21	17	12
23	38	56	70	62	35	18	13	28	12	32	15	12
24	44	87	65	57	35	17	12	34	11	16	14	12
25	44	55	60	57	30	17	89	36	11	15	29	15
26	42	50	62	58	29	24	13	36	11	14	7.4	15
27	43	59	60	56	29	75	14	41	11	12	7.7	29
28	43	60	184	56	28	28	13	25	10	14	15	14
29	43	60	196	56	30	21	14	33	9.8	14	15	12
30	49	60	71	56	---	18	13	29	14	14	16	26
31	47	---	55	55	---	7.0	---	27	---	15	20	---
TOTAL	1419	1601	2167	1968	1329	715.0	563.7	1868.66	363.5	423	838.1	1105.6
MEAN	45.8	53.4	69.9	63.5	45.8	23.1	18.8	60.3	12.1	13.6	27.0	36.9
MAX	63	87	196	84	78	75	89	241	23	32	240	416
MIN	32	33	45	55	27	7.0	3.7	.86	3.4	10	7.4	7.1
AC-FT	2810	3180	4300	3900	2640	1420	1120	3710	721	839	1660	2190

CAL YR 1979 TOTAL 39455.00 MEAN 108 MAX 1060 MIN 29 AC-FT 78260
WTR YR 1980 TOTAL 14361.56 MEAN 39.2 MAX 416 MIN .86 AC-FT 28490

GUADALUPE RIVER BASIN

08178620 LORENCE CREEK AT THOUSAND OAKS BOULEVARD, SAN ANTONIO, TX
(Flood-hydrograph partial-record station)

LOCATION.--Lat 29°35'24", long 98°27'47", Bexar County, Hydrologic Unit 12310030l, on right bank 30 ft (9 m) upstream from Thousand Oaks Boulevard and 4.2 mi (6.8 km) upstream from mouth.

DRAINAGE AREA.--4.05 mi^2 (10.5 km^2).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--January to September 1980.

GAGE.--Digital recorders (stage and rainfall), concrete control, and crest-stage gages. Gage is not referenced to National Geodetic Vertical Datum of 1929.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 41 ft^3/s (1.16 m^3/s) May 15 at 1100 hours, gage height, 1.76 ft (0.336 m); no flow most of time.

EXTREMES FOR CURRENT YEAR.--Maximum discharge during period January to September, 41 ft^3/s (1.16 m^3/s) May 15 at 1100 hours, gage height, 1.76 ft (0.536 m); water-quality samples were made on this date; no flow most of time.

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical, biochemical, and pesticide analyses: January to September 1980.

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	TIME	STREAM-FLOW, INSTANTANEOUS (CFS)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH FIELD (UNITS)	TEMPERATURE, WATER (DEG C)	COLOR (PLATINUM COBALT UNITS)	TURBIDITY (NTU)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)	OXYGEN DEMAND, BIOCHEM UNINHIB 5 DAY (MG/L)
MAY										
15...	1045	18	127	8.5	21.0	140	110	9.2	106	5.0
15...	1051	38	126	7.9	21.0	120	50	7.8	90	5.0
15...	1130	31	126	8.0	21.0	100	52	7.6	87	3.7
15...	1245	7.0	125	7.2	21.0	100	44	7.2	83	3.0
15...	1423	14	140	7.9	22.0	100	26	7.0	81	3.6

DATE	COLIFORM, TOTAL, IMMED. (COLS. PER 100 ML)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML)	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARDNESS (MG/L AS CACO3)	HARDNESS, NONCARBONATE (MG/L CACO3)	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	SODIUM ADSORPTION RATIO
MAY									
15...	K180000	K92000	97000	52	0	19	1.1	1.6	.1
15...	K60000	45000	83000	50	0	18	1.3	1.8	.1
15...	>20000	20000	46000	55	0	20	1.3	1.2	.1
15...	K130000	K11000	64000	52	0	19	1.2	1.2	.1
15...	44000	25000	61000	60	0	22	1.3	1.4	.1

DATE	POTASSIUM, DISSOLVED (MG/L AS K)	BICARBONATE (MG/L AS HCO3)	CARBONATE (MG/L AS CO3)	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	SOLIDS, RESIDUE AT 105 DEG. C, SUSPENDED (MG/L)
MAY									
15...	7.5	68	1	3.6	3.0	.1	11	81	320
15...	7.6	67	0	2.5	3.1	.1	13	81	68
15...	5.6	70	0	1.8	3.1	.1	12	80	69
15...	5.2	70	0	1.1	3.0	.1	12	77	43
15...	5.4	80	0	2.3	2.4	.1	13	87	15

DATE	SOLIDS, VOLATILE, SUSPENDED (MG/L)	NITROGEN, NITRATE TOTAL (MG/L AS N)	NITROGEN, NITRITE TOTAL (MG/L AS N)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N)	NITROGEN, AMMONIA TOTAL (MG/L AS N)	NITROGEN, ORGANIC TOTAL (MG/L AS N)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N)	PHOSPHORUS, TOTAL (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)
MAY									
15...	46	.57	.010	.58	.090	1.5	1.6	.380	--
15...	34	.66	.010	.67	.090	1.2	1.3	.370	18
15...	19	.51	.010	.52	.060	1.0	1.1	.250	--
15...	15	.35	.010	.36	.030	.83	.86	.220	15
15...	11	.29	.010	.30	.040	.86	.90	.200	--

08178620 LORENCE CREEK AT THOUSAND OAKS BOULEVARD, SAN ANTONIO, TX--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	TIME	ARSENIC TOTAL (UG/L AS AS)	ARSENIC SUS-PENDED TOTAL (UG/L AS AS)	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	CADMIUM TOTAL RECOV-ERABLE (UG/L AS CD)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, TOTAL RECOV-ERABLE (UG/L AS CR)	CHRO-MIUM, SUS-PENDED RECOV. (UG/L AS CR)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU)
MAY											
15...	1051	1	0	1	10	1	<1	0	0	0	5
15...	1245	--	--	1	10	--	<1	--	--	0	--
15...	1423	--	--	1	10	--	<1	--	--	0	--

DATE	COPPER, SUS-PENDED RECOV-ERABLE (UG/L AS CU)	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, TOTAL RECOV-ERABLE (UG/L AS FE)	IRON, SUS-PENDED RECOV-ERABLE (UG/L AS FE)	IRON, DIS-SOLVED (UG/L AS FE)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB)	LEAD, SUS-PENDED RECOV-ERABLE (UG/L AS PB)	LEAD, DIS-SOLVED (UG/L AS PB)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN)	MANGA-NESE, SUS-PENDED RECOV. (UG/L AS MN)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)
MAY											
15...	4	1	1700	1600	90	15	15	0	60	60	4
15...	--	2	--	--	80	--	--	0	--	--	4
15...	--	4	--	--	70	--	--	4	--	--	4

DATE	MERCURY TOTAL RECOV-ERABLE (UG/L AS HG)	MERCURY SUS-PENDED RECOV-ERABLE (UG/L AS HG)	MERCURY DIS-SOLVED (UG/L AS HG)	SELE-NIUM, TOTAL (UG/L AS SE)	SELE-NIUM, SUS-PENDED TOTAL (UG/L AS SE)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN)	ZINC, SUS-PENDED RECOV-ERABLE (UG/L AS ZN)	ZINC, DIS-SOLVED (UG/L AS ZN)
MAY										
15...	.2	.0	.2	0	0	0	0	20	20	4
15...	--	--	.1	--	--	0	0	--	--	7
15...	--	--	.1	--	--	0	0	--	--	5

DATE	TIME	PCB TOTAL (UG/L)	NAPH-THA-LENES, POLY-CHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)	CHLOR-DANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DI-AZINON, TOTAL (UG/L)
MAY									
15...	1051	.00	.00	.00	.1	.00	.00	.00	.01
15...	1245	.00	.00	.00	.0	.00	.00	.00	.09

DATE	DI-ELDRIN TOTAL (UG/L)	ENDO-SULFAN, TOTAL (UG/L)	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTA-CHLOR, TOTAL (UG/L)	HEPTA-CHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALA-THION, TOTAL (UG/L)	METH-OXY-CHLOR, TOTAL (UG/L)
MAY									
15...	.00	.00	.00	.00	.00	.00	.00	.00	.00
15...	.00	.00	.00	.00	.00	.00	.00	.01	.00

DATE	METHYL PARA-THION, TOTAL (UG/L)	METHYL TRI-THION, TOTAL (UG/L)	MIREX, TOTAL (UG/L)	PARA-THION, TOTAL (UG/L)	TOX-APHENE, TOTAL (UG/L)	TOTAL TRI-THION (UG/L)	2,4-D, TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)	SILVEX, TOTAL (UG/L)
MAY									
15...	.00	.00	.00	.00	0	.00	.00	.00	.00
15...	.00	.00	.00	.00	0	.00	.01	.00	.00

GUADALUPE RIVER BASIN

08178640 WEST ELM CREEK AT SAN ANTONIO, TX
(Flood-hydrograph partial-record station)

LOCATION.--Lat 29°37'23", long 98°26'29", Bexar County, Hydrologic Unit 12100301, at mid-channel, 1.8 mi (2.9 km) upstream from mouth of East Elm Creek, 2.1 mi (3.4 km) upstream from Farm Road 1604, and 7.0 mi (11.3 km) north of San Antonio International Airport.

DRAINAGE AREA.--2.45 mi^2 (6.35 km^2).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--February 1976 to current year.

GAGE.--Digital recorders (stage and rainfall) and crest-stage gages. Gage is not referenced to National Geodetic Vertical Datum 1929.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 335 ft^3/s (9.49 m^3/s) Sept. 28 1976, gage height, 4.30 ft (1.311 m); maximum gage height, 4.48 ft (1.366 m) May 15, 1980.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 327 ft^3/s (9.26 m^3/s) May 15 at 1107 hours, gage height, 4.48 ft (1.366 m), no other peak discharges above base of 100 ft^3/s (2.83 m^3/s); water-quality samples were made on this date; no flow most of time.

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical, biochemical, pesticide, and bacteria analyses: May 1976 to current year. Water temperaturee: May 1976 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	TIME	STREAM-FLOW, INSTANTANEOUS (CFS)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH FIELD (UNITS)	TEMPERATURE, WATER (DEG C)	COLOR (PLATINUM COBALT UNITS)	TURBIDITY (NTU)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)	OXYGEN DEMAND, BIOCHEM UNINHIB 5 DAY (MG/L)
MAY										
15...	1010	226	86	9.1	21.0	300	1700	9.2	104	5.8
15...	1030	174	86	8.3	21.0	210	480	9.0	102	6.4
15...	1145	132	120	7.9	21.5	100	63	9.2	106	3.9
15...	1230	49	136	6.7	22.0	80	42	9.0	105	3.9
15...	1533	42	141	8.2	24.0	80	42	8.2	99	2.7

DATE	COLIFORM, TOTAL, IMMED. (COLS. PER 100 ML)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML)	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARDNESS (MG/L AS CACO3)	HARDNESS, NONCARBONATE (MG/L CACO3)	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	SODIUM ADSORPTION RATIO
MAY									
15...	110000	K37000	26000	37	1	14	.5	.7	.1
15...	100000	23000	27000	37	2	14	.6	.6	.0
15...	220000	43000	41000	59	3	22	.9	.9	.1
15...	73000	66000	80000	64	1	24	.9	1.2	.1
15...	K80000	K12000	16000	66	0	25	.9	1.1	.1

DATE	POTASSIUM, DISSOLVED (MG/L AS K)	BICARBONATE (MG/L AS HCO3)	CARBONATE (MG/L AS CO3)	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	SOLIDS, RESIDUE AT 105 DEG. C, SUSPENDED (MG/L)
MAY									
15...	3.0	38	3	2.4	2.3	.1	6.3	51	776
15...	3.2	43	0	2.0	3.8	.1	7.0	53	239
15...	3.2	68	0	2.4	1.9	.1	8.7	74	117
15...	3.6	76	0	1.9	2.7	.1	9.4	81	124
15...	3.3	89	0	2.0	1.8	.1	11	89	58

DATE	SOLIDS, VOLATILE, SUSPENDED (MG/L)	NITROGEN, NITRATE TOTAL (MG/L AS N)	NITROGEN, NITRITE TOTAL (MG/L AS N)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N)	NITROGEN, AMMONIA TOTAL (MG/L AS N)	NITROGEN, ORGANIC TOTAL (MG/L AS N)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N)	PHOSPHORUS, TOTAL (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)
MAY									
15...	480	.38	.010	.39	.090	61	61	.530	120
15...	82	.40	.010	.41	.130	3.2	3.3	.320	40
15...	20	.26	.010	.27	.040	1.7	1.7	.160	16
15...	25	.25	.010	.26	.040	1.4	1.4	.160	15
15...	24	.18	.010	.19	.030	.97	1.0	.090	13

08178640 WEST ELM CREEK AT SAN ANTONIO, TX--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	TIME	ARSENIC TOTAL (UG/L AS AS)	ARSENIC SUS-PENDED TOTAL (UG/L AS AS)	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	CADMIUM TOTAL RECOV-ERABLE (UG/L AS CD)	CADMIUM SUS-PENDED RECOV-ERABLE (UG/L AS CD)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, TOTAL RECOV-ERABLE (UG/L AS CR)	CHRO-MIUM, SUS-PENDED RECOV. (UG/L AS CR)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)
MAY											
15...	1010	--	--	1.	5	--	--	<1	--	--	0
15...	1030	6	5	1	0	1	0	1	20	20	0
15...	1145	--	--	1	8	--	--	<1	--	--	0
15...	1230	--	--	1	9	--	--	<1	--	--	0

DATE	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU)	COPPER, SUS-PENDED RECOV-ERABLE (UG/L AS CU)	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, TOTAL RECOV-ERABLE (UG/L AS FE)	IRON, SUS-PENDED RECOV-ERABLE (UG/L AS FE)	IRON, DIS-SOLVED (UG/L AS FE)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB)	LEAD, SUS-PENDED RECOV-ERABLE (UG/L AS PB)	LEAD, DIS-SOLVED (UG/L AS PB)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN)	MANGA-NESE, SUS-PENDED RECOV. (UG/L AS MN)
MAY											
15...	--	--	4	--	--	160	--	--	2	--	--
15...	19	17	2	19000	19000	290	39	39	0	700	690
15...	--	--	4	--	--	100	--	--	0	--	--
15...	--	--	4	--	--	50	--	--	0	--	--

DATE	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MERCURY TOTAL RECOV-ERABLE (UG/L AS HG)	MERCURY SUS-PENDED RECOV-ERABLE (UG/L AS HG)	MERCURY DIS-SOLVED (UG/L AS HG)	SELE-NIUM, TOTAL (UG/L AS SE)	SELE-NIUM, SUS-PENDED TOTAL (UG/L AS SE)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN)	ZINC, SUS-PENDED RECOV-ERABLE (UG/L AS ZN)	ZINC, DIS-SOLVED (UG/L AS ZN)
MAY											
15...	4	--	--	.0	--	--	0	0	--	--	<3
15...	10	.6	.6	.0	0	0	0	0	80	70	10
15...	3	--	--	.1	--	--	0	0	--	--	<3
15...	2	--	--	.1	--	--	0	0	--	--	3

DATE	TIME	PCB TOTAL (UG/L)	NAPH-THA-LENES, POLY-CHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)	CHLOR-DANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DI-AZINON, TOTAL (UG/L)
MAY									
15...	1010	.00	.00	.00	.0	.00	.00	.01	.00
15...	1030	.00	.00	.00	.0	.00	.00	.01	.00

DATE	DI-ELDRIN TOTAL (UG/L)	ENDO-SULFAN, TOTAL (UG/L)	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTA-CHLOR, TOTAL (UG/L)	HEPTA-CHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALA-THION, TOTAL (UG/L)	METH-OXY-CHLOR, TOTAL (UG/L)
MAY									
15...	.00	.00	.00	.00	.00	.00	.00	.00	.00
15...	.00	.00	.00	.00	.00	.00	.00	.00	.00

DATE	METHYL PARA-THION, TOTAL (UG/L)	METHYL TRI-THION, TOTAL (UG/L)	MIREX, TOTAL (UG/L)	PARA-THION, TOTAL (UG/L)	TOX-APHENE, TOTAL (UG/L)	TOTAL TRI-THION (UG/L)	2,4-D, TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)	SILVEX, TOTAL (UG/L)
MAY									
15...	.00	.00	.00	.00	0	.00	.00	.00	.00
15...	.00	.00	.00	.00	0	.00	.00	.00	.00

GUADALUPE RIVER BASIN

08178645 EAST ELM CREEK AT SAN ANTONIO, TX
(Flood-hydrograph partial-record station)

LOCATION.--Lat 29°37'04", long 98°25'41", Bexar County, Hydrologic Unit 12100301, at mid-channel, 2.1 mi (3.4 km) upstream from West Elm Creek, 2.4 mi (3.9 km) upstream from Farm Road 1604, and 6.9 mi (11.1 km) north of San Antonio International Airport.

DRAINAGE AREA.--2.33 mi^2 (6.03 km^2).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--November 1975 to current year.

GAGE.--Digital recorders (stage and rainfall) and crest-stage gages. Gage is not referenced to National Geodetic Vertical Datum of 1929.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 310 ft^3/s (8.78 m^3/s) May 7, 1975, gage height, 6.78 ft (2.067 m).

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 106 ft^3/s (3.00 m^3/s) May 5 at 1150, gage height, 4.93 ft (1.503 m), no other peak discharge above base of 100 ft^3/s (2.83 m^3/s); water-quality samples were made on this date; no flow most of time.

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical, biochemical, pesticide, and bacteria analyses: May 1976 to current year. Water temperatures: May 1976 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	COLOR (PLAT-INUM COBALT UNITS)	TUR-BID-ITY (NTU)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)	OXYGEN DEMAND, BIOCHEM UNINHIB 5 DAY (MG/L)
MAY										
15...	1139	44	76	8.0	20.5	100	54	8.0	91	5.1
15...	1151	103	73	7.9	20.5	80	48	9.1	103	4.3
15...	1225	72	82	7.8	20.5	80	29	9.0	102	3.4
15...	1357	32	102	8.0	20.5	80	14	8.2	93	2.8
15...	1707	16	108	7.9	20.5	100	21	8.3	94	3.0

DATE	COLI-FORM, TOTAL, IMMED. (COLS. PER 100 ML)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO
MAY									
15...	76000	K66000	60000	27	0	10	.6	.3	.0
15...	61000	54000	33000	33	0	12	.8	.6	.0
15...	K30000	28000	28000	35	0	13	.6	.7	.1
15...	K30000	21000	27000	46	0	17	.9	.8	.1
15...	>26000	26000	11000	49	0	18	.9	.8	.1

DATE	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	BICAR-BONATE (MG/L AS HCO3)	CAR-BONATE (MG/L AS CO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	SOLIDS, RESIDUE AT 105 DEG. C, SUS-PENDED (MG/L)
MAY									
15...	4.8	37	0	1.9	1.3	.0	8.7	46	137
15...	4.2	43	0	2.0	1.0	.1	8.6	51	99
15...	4.0	48	0	1.0	3.1	.0	9.0	55	44
15...	3.9	57	0	1.5	2.9	.0	10	65	17
15...	4.2	60	0	2.2	1.9	.1	14	72	18

DATE	SOLIDS, VOLA-TILE, SUS-PENDED (MG/L)	NITRO-GEN, NITRATE TOTAL (MG/L AS N)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS-PHORUS, TOTAL (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)
MAY									
15...	39	.28	.010	.29	.100	2.9	3.0	.150	24
15...	30	.25	.010	.26	.090	1.3	1.4	.130	19
15...	16	.22	.010	.23	.060	1.0	1.1	.100	14
15...	13	.33	.010	.34	.060	.85	.91	.070	16
15...	11	.11	.010	.12	.060	.87	.93	.070	14

GUADALUPE RIVER BASIN

08178645 EAST ELM CREEK AT SAN ANTONIO, TX--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	TIME	ARSENIC TOTAL (UG/L AS AS)	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	CADMIUM TOTAL RECOV-ERABLE (UG/L AS CD)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, TOTAL RECOV-ERABLE (UG/L AS CR)	CHRO-MIUM, SUS-PENDED RECOV. (UG/L AS CR)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU)
MAY										
15...	1139	--	0	4	--	<1	--	--	0	--
15...	1151	ND	0	5	0	<1	10	10	0	1
15...	1225	--	0	5	--	<1	--	--	0	--

DATE	COPPER, SUS-PENDED RECOV-ERABLE (UG/L AS CU)	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, TOTAL RECOV-ERABLE (UG/L AS FE)	IRON, SUS-PENDED RECOV-ERABLE (UG/L AS FE)	IRON, DIS-SOLVED (UG/L AS FE)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB)	LEAD, SUS-PENDED RECOV-ERABLE (UG/L AS PB)	LEAD, DIS-SOLVED (UG/L AS PB)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN)	MANGA-NESE, SUS-PENDED RECOV. (UG/L AS MN)
MAY										
15...	--	1	--	--	60	--	--	1	--	--
15...	0	14	2000	2000	50	7	6	1	60	60
15...	--	3	--	--	50	--	--	2	--	--

DATE	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MERCURY TOTAL RECOV-ERABLE (UG/L AS HG)	MERCURY SUS-PENDED RECOV-ERABLE (UG/L AS HG)	MERCURY DIS-SOLVED (UG/L AS HG)	SELE-NIUM, TOTAL (UG/L AS SE)	SELE-NIUM, SUS-PENDED TOTAL (UG/L AS SE)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN)	ZINC, DIS-SOLVED (UG/L AS ZN)
MAY										
15...	2	--	--	.1	--	--	0	0	--	<3
15...	2	.6	.5	.1	0	0	0	0	20	<3
15...	2	--	--	.1	--	--	0	0	--	9

DATE	TIME	PCB TOTAL (UG/L)	NAPH-THA-LENES, POLY-CHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)	CHLOR-DANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DI-AZINON, TOTAL (UG/L)
MAY									
15...	1139	.00	.00	.00	.0	.00	.00	.00	.00
15...	1151	.00	.00	.00	.0	.00	.00	.00	.00

DATE	DI-ELDRIN TOTAL (UG/L)	ENDO-SULFAN, TOTAL (UG/L)	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTA-CHLOR, TOTAL (UG/L)	HEPTA-CHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALA-THION, TOTAL (UG/L)	METH-OXY-CHLOR, TOTAL (UG/L)
MAY									
15...	.00	.00	.00	.00	.00	.00	.00	.00	.00
15...	.00	.00	.00	.00	.00	.00	.00	.00	.00

DATE	METHYL PARA-THION, TOTAL (UG/L)	METHYL TRI-THION, TOTAL (UG/L)	MIREX, TOTAL (UG/L)	PARA-THION, TOTAL (UG/L)	TOX-APHENE, TOTAL (UG/L)	TOTAL TRI-THION (UG/L)	2,4-D, TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)	SILVEX, TOTAL (UG/L)
MAY									
15...	.00	.00	.00	.00	0	.00	.00	.00	.00
15...	.00	.00	.00	.00	0	.00	.00	.00	.00

GUADALUPE RIVER BASIN

08178700 SALADO CREEK (UPPER STATION) AT SAN ANTONIO, TX

LOCATION.--Lat 29°30'57", long 98°25'51", Bexar County, Hydrologic Unit 12100301, on upstream side of upstream bridge of two bridges on Interstate Highway 410 in San Antonio, 1.0 mi (1.6 km) west of Northeast School, 1.1 mi (1.8 km) upstream from Perrin-Beitel Creek, and 2.7 mi (4.3 km) east of San Antonio International Airport.

DRAINAGE AREA.--137 mi^2 (355 km^2).

PERIOD OF RECORD.--September 1960 to current year.

GAGE.--Water-stage recorder with concrete control. Datum of gage is 684.60 ft (208.666 m) National Geodetic Vertical Datum of 1929.

REMARKS.--Records poor. No known diversion above station. Recording rain gage located at station with four additional recording rain gages located in watershed. Flow is affected at times by discharge from flood-detention pools of nine floodwater-retarding structures with combined detention capacity of 24,460 acre-ft (30.2 hm^3). These structures control runoff from 67.7 mi^2 (175.3 km^2) above this station.

AVERAGE DISCHARGE.--20 years, 9.94 ft^3/s (0.282 m^3/s), 0.98 in/yr (25 mm/yr), 7,200 acre-ft/yr (8.88 hm^3/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 24,900 ft^3/s (705 m^3/s) May 12, 1972, gage height, 15.22 ft (4.639 m), from rating curve extended above 8,000 ft^3/s (227 m^3/s) on basis of slope-area measurement of peak flow; no flow at times.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1853, 23 to 24 ft (7.0 to 7.3 m) in October 1913. Flood in September 1921 reached a stage of 18 ft (5.5 m), and flood of Sept. 27, 1946, reached a stage of 18.2 ft (5.55 m), and are the highest since 1899.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 232 ft^3/s (6.57 m^3/s) Sept. 6, time unknown, gage height, 4.36 ft (1.329 m), from floodmark, no peak above base of 250 ft^3/s (7.08 m^3/s); no flow at times.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.3	.40	.10	3.1	1.6	.20	4.8	30	.70	.30	.20	.20
2	1.1	.40	.10	3.0	1.5	.20	2.4	5.0	.60	.20	.20	.20
3	2.0	.30	.10	2.9	1.4	.20	2.2	3.7	.60	.10	.20	.10
4	4.7	.30	.10	2.9	1.4	.20	2.1	3.5	.50	.10	.20	.10
5	2.8	.30	.10	2.8	1.3	.20	2.0	3.4	.50	.10	.20	.10
6	.43	.20	.10	2.8	1.2	.20	2.0	3.3	.40	.00	2.6	50
7	.40	.20	.10	2.7	1.1	.20	1.9	3.2	.40	.00	1.0	15
8	.41	.20	.10	2.7	1.0	.20	1.8	3.2	.40	.00	.60	5.0
9	.36	.20	.10	2.6	.90	.20	1.8	3.1	.40	.00	3.0	2.6
10	.15	.20	.10	2.6	.90	.20	1.8	3.0	.40	.00	20	2.0
11	1.2	.20	.10	2.5	.80	.20	3.0	3.0	.30	.00	10	1.2
12	.50	.20	14	2.4	.80	.20	5.0	3.2	.30	.00	5.0	.80
13	.40	.20	8.0	2.4	.70	.20	3.5	100	.30	.00	2.5	.40
14	.40	.10	5.0	2.4	.70	.20	2.5	90	.30	.00	1.6	.30
15	1.2	.10	3.9	2.3	.60	.20	2.0	65	.20	.00	.60	.20
16	.60	.10	3.7	2.3	.50	7.0	1.7	55	.20	.00	.40	.10
17	.50	4.0	3.6	2.2	.40	3.2	1.6	50	.20	.00	.30	.10
18	.40	10	3.5	2.2	.40	3.0	1.5	140	.20	.00	.20	.00
19	.40	2.3	3.4	2.2	.40	2.8	1.4	40	.10	.00	.10	.00
20	.40	6.0	3.4	2.1	.30	2.7	1.3	20	.10	.00	.00	.00
21	.40	12	3.3	2.1	.30	2.6	1.3	50	10	.00	.00	.00
22	.30	8.0	3.3	4.0	.30	2.5	1.2	9.0	2.5	3.0	.00	.00
23	.30	2.0	3.4	2.7	.30	2.5	1.2	5.0	2.0	2.4	.00	.00
24	.20	5.0	3.3	2.1	.30	2.4	1.2	3.2	1.6	1.6	.00	.00
25	.20	3.3	3.1	2.0	.20	2.4	20	2.5	1.2	1.0	.00	.00
26	.20	1.4	3.0	2.0	.20	2.3	8.0	2.2	1.0	.80	2.0	2.0
27	.20	.40	3.0	1.9	.20	5.4	4.5	2.0	.80	.60	.80	7.0
28	.20	.20	30	1.8	.20	3.6	4.0	1.4	.60	.50	.50	4.0
29	.40	.10	8.0	1.8	.20	2.4	3.9	1.2	.50	.40	.40	2.7
30	1.0	.10	3.5	1.7	---	2.2	3.7	1.0	.40	.30	.30	6.0
31	.40	---	3.2	1.6	---	2.1	---	.80	---	.20	.20	---
TOTAL	23.45	58.40	116.70	74.8	20.10	52.10	95.3	705.90	27.70	11.60	53.10	100.10
MEAN	.76	1.95	3.76	2.41	.69	1.68	3.18	22.8	.92	.37	1.71	3.34
MAX	4.7	12	30	4.0	1.6	7.0	20	140	10	3.0	20	50
MIN	.15	.10	.10	1.6	.20	.20	1.2	.80	.10	.00	.00	.00
CFSM	.006	.01	.03	.02	.005	.01	.02	.17	.007	.003	.01	.02
IN.	.01	.02	.03	.02	.01	.01	.03	.19	.01	.00	.01	.03
AC-FT	47	116	231	148	40	103	189	1400	55	23	105	199
(††)	.02	1.69	1.88	.66	.77	1.97	1.27	6.38	1.12	.08	2.31	6.44

CAL YR 1979 TOTAL 4377.14 MEAN 12.0 MAX 1210 MIN .00 CFSM .09 IN 1.19 AC-FT 8680 †† 39.74
WTR YR 1980 TOTAL 1339.25 MEAN 3.66 MAX 140 MIN .00 CFSM .03 IN .36 AC-FT 2660 †† 24.59

†† Weighted-mean rainfall, in inches.

08178800 SALADO CREEK (LOWER STATION) AT SAN ANTONIO, TX

LOCATION.--Lat 29°21'25", long 98°24'45", Bexar County, Hydrologic Unit 12100301, on right bank at upstream side of bridge on Loop 13 at San Antonio, 1.4 mi (2.3 km) east of Brooks Air Force Base, and 3.3 mi (5.3 km) upstream from Rosillo Creek.

DRAINAGE AREA.--189 mi² (490 km²).

PERIOD OF RECORD.--September 1960 to current year.

GAGE.--Water-stage recorder. Datum of gage is 526.95 ft (160.614 m) National Geodetic Vertical Datum of 1929.

REMARKS.--Records good. Small diversions above station. Recording rain gage located at station with six additional recording rain gages located in watershed. Most of low flow comes from artesian wells and springs in city of San Antonio. For statement regarding regulation by Soil Conservation Service floodwater-retarding structures, see station 08178700.

AVERAGE DISCHARGE.--20 years, 42.7 ft³/s (1.209 m³/s), 3.07 in/yr (78 mm/yr), 30,940 acre-ft/yr (38.1 hm³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,100 ft³/s (371 m³/s) Sept. 27, 1973, gage height, 28.83 ft (8.787 m); no flow Aug. 13, 1967.
Maximum stage since at least 1941, that of Sept. 27, 1973.

EXTREMES OUTSIDE PERIOD OF RECORD.--Floods of Sept. 27, 1946, and Aug. 15, 1960, were about equal magnitude. Flood of Aug. 15, 1960, reached a stage of 26.8 ft (8.17 m), from floodmarks.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 600 ft³/s (17.0 m³/s) and maximum (*):

Date	Time	Discharge (ft³/s)	Discharge (m³/s)	Gage height (ft)	Gage height (m)
May 15	2200	617	17.5	11.55	3.520
May 19	0100	664	18.8	11.78	3.591
Sept. 7	1900	*807	22.9	12.39	3.776

Minimum discharge, 5.0 ft³/s (0.14 m³/s) Aug. 23.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	20	30	42	28	31	28	24	48	23	9.6	9.4	11
2	19	30	45	32	33	26	31	141	24	8.5	11	11
3	19	32	45	32	33	26	29	42	26	8.3	11	12
4	20	33	40	33	30	27	26	29	24	7.9	11	12
5	27	31	38	32	30	27	25	24	25	13	12	11
6	27	30	38	34	29	28	26	23	25	13	9.5	26
7	24	37	38	38	29	27	25	22	22	12	10	475
8	27	37	42	38	30	28	24	52	21	13	9.2	268
9	25	37	43	38	36	29	22	65	22	13	10	46
10	24	41	48	39	35	30	22	32	23	12	101	33
11	24	41	43	39	32	28	22	25	22	13	182	24
12	22	38	48	37	30	26	25	24	21	13	25	20
13	23	38	62	37	29	23	36	49	20	13	11	19
14	25	37	56	39	31	25	35	254	18	13	10	18
15	24	38	43	39	30	26	30	358	17	12	9.2	17
16	23	38	38	39	50	27	24	207	20	13	8.7	16
17	22	44	41	39	39	29	22	157	18	10	9.4	16
18	20	59	42	38	30	27	22	78	16	11	9.2	15
19	21	35	46	39	28	27	23	431	16	8.2	8.4	15
20	24	32	47	46	27	27	24	65	14	7.9	7.9	15
21	27	71	47	39	28	26	23	225	14	11	7.7	15
22	27	52	47	94	29	25	22	77	37	13	7.2	15
23	25	37	53	49	30	26	21	38	20	18	6.3	15
24	25	39	60	32	29	27	20	30	14	12	6.5	14
25	25	57	49	29	27	25	80	29	12	9.8	6.2	15
26	27	44	48	28	25	30	49	27	10	9.3	11	20
27	28	40	46	28	25	51	24	25	12	12	9.1	24
28	30	37	57	28	26	76	20	26	11	11	9.5	26
29	31	38	214	29	28	32	19	26	11	11	9.5	20
30	32	40	41	30	---	26	18	26	9.9	10	10	23
31	31	---	28	30	---	24	---	24	---	9.3	10	---
TOTAL	768	1193	1570	1152	889	909	813	2679	567.9	350.8	567.9	1267
MEAN	24.8	39.8	50.6	37.2	30.7	29.3	27.1	86.4	18.9	11.3	18.3	42.2
MAX	32	71	214	94	50	76	80	431	37	18	182	475
MIN	19	30	28	28	25	23	18	22	9.9	7.9	6.2	11
CFSM	.13	.21	.27	.20	.16	.16	.14	.46	.10	.06	.10	.22
IN.	.15	.23	.31	.23	.17	.18	.16	.53	.11	.07	.11	.25
AC-FT	1520	2370	3110	2280	1760	1800	1610	5310	1130	696	1130	2510
(††)	.04	1.53	1.96	.70	.80	1.66	1.39	6.76	1.01	.08	2.62	6.17

CAL YR 1979 TOTAL 22720.0 MEAN 62.2 MAX 1800 MIN 19 CFSM .33 IN 4.47 AC-FT 45070 †† 37.58
WTR YR 1980 TOTAL 12726.6 MEAN 34.8 MAX 475 MIN 6.2 CFSM .18 IN 2.50 AC-FT 25240 †† 24.72

†† Weighted-mean rainfall, in inches, based on seven rain gages.

GUADALUPE RIVER BASIN

08181400 HELOTES CREEK AT HELOTES, TX

LOCATION.--Lat 29°34'42", long 98°41'29", Bexar County, Hydrologic Unit 12100302, 42 ft (13 m) left of and 44 ft (13 m) downstream from centerline of bridge on State Highway 16, 0.1 mi (0.2 km) northwest of Helotes, and 8.6 mi (13.8 km) upstream from mouth.

DRAINAGE AREA.--15.0 mi^2 (38.8 km^2).

PERIOD OF RECORD.--June 1968 to current year.

REVISED RECORDS.--WRD TX-73-1: 1972(M).

GAGE.--Water-stage recorder. Datum of gage is 1,014.82 ft (309.317 m) National Geodetic Vertical Datum of 1929.

REMARKS.--Records good. An undetermined amount of flow is diverted for domestic use above the station, and some flow enters the Edwards and associated limestones through the Balcones Fault Zone in the vicinity of the gage. Recording rain gage located at station, with two additional recording rain gages located in watershed.

AVERAGE DISCHARGE.--12 years, 4.44 ft^3/s (0.126 m^3/s), 4.02 in/yr (102 mm/yr), 3,220 acre-ft/yr (3.97 hm^3/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,680 ft^3/s (217 m^3/s) July 16, 1973, gage height, 10.8 ft (3.29 m), from floodmarks, from rating curve extended above 5,000 ft^3/s (142 m^3/s); no flow most of time.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since 1923, 13.7 ft (4.18 m) in 1927, from information by local resident.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 18 ft^3/s (0.51 m^3/s) Nov. 17 at 2300 hours, gage height, 1.91 ft (0.582 m), no peak above base of 140 ft^3/s (3.96 m^3/s); no flow for many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	.00	.27	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.03
7	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.45
8	.00	.00	.00	.00	.00	.00	.00	.20	.00	.00	.00	.00
9	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.18	.00
11	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
12	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
13	.00	.00	.00	.00	.00	.00	.00	.39	.00	.00	.00	.00
14	.00	.00	.00	.00	.00	.00	.00	.12	.00	.00	.00	.00
15	.00	.00	.00	.00	.06	.00	.00	.13	.00	.00	.00	.00
16	.00	.00	.00	.00	.04	.00	.00	.08	.00	.00	.00	.00
17	.00	.34	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
18	.00	.03	.00	.00	.00	.00	.00	.11	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	.00	.00	.01	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
21	.00	.04	.00	.00	.00	.00	.00	.22	.00	.00	.00	.00
22	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
23	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
24	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
25	.00	.00	.00	.00	.00	.00	.18	.00	.00	.00	.00	.00
26	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27	.00	.00	.00	.00	.00	.18	.00	.00	.00	.00	.00	.12
28	.00	.00	.29	.00	.00	.00	.00	.00	.00	.00	.00	.20
29	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
30	.00	.00	.00	.00	---	.00	.00	.00	.00	.00	.00	.00
31	.00	---	.00	.00	---	.00	---	.00	---	.00	.00	---
TOTAL	.00	.41	.29	.00	.10	.18	.18	1.53	.00	.00	.18	.80
MEAN	.000	.014	.009	.000	.003	.006	.006	.049	.000	.000	.006	.027
MAX	.00	.34	.29	.00	.06	.18	.18	.39	.00	.00	.18	.45
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CFSM	.000	.001	.001	.000	.000	.000	.000	.003	.000	.000	.000	.002
IN.	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	.00	.8	.6	.00	.2	.4	.4	3.0	.00	.00	.4	1.6
(††)	.00	3.59	1.89	.87	.94	1.55	1.71	6.45	.21	.07	2.69	8.29

CAL YR 1979 TOTAL 2537.68 MEAN 6.95 MAX 219 MIN .00 CFSM .46 IN 6.29 AC-FT 5030 †† 36.13
WTR YR 1980 TOTAL 3.67 MEAN .010 MAX .45 MIN .00 CFSM .001 IN .01 AC-FT 7.3 †† 28.26

†† Weighted-mean rainfall, in inches.

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY PERIOD :1980 WATER YEAR

DATE	GAGE NUMBER										
	1-S	3-S	4-S	5-S	1-ES	2-ES	3-ES	1-H	2-H	3-H	1-A
OCT											
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.07	0.15	0.07	0.00	0.16	0.18	0.00	0.00	0.00	0.05
MTOT	0.00	0.07	0.16	0.08	0.00	0.18	0.18	0.00	0.00	0.00	0.05
NOV											
6	0.00	0.00	0.04	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.04
10	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.01	0.00	0.00	0.00
17	1.31	0.57	0.51	0.71	0.61	0.61	0.45	2.87	2.63	2.32	0.50
18	0.40	0.04	0.03	0.06	0.02	0.02	0.01	0.02	0.04	0.02	0.01
19	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.01
20	0.17	0.09	0.09	0.03	0.13	0.13	0.20	0.18	0.22	0.21	0.05
21	0.00	0.38	0.42	0.00	0.42	0.42	0.43	0.28	0.35	0.37	0.07
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00
24	0.00	0.32	0.35	0.00	0.36	0.36	0.38	0.26	0.24	0.29	0.34
25	0.00	0.02	0.00	0.00	0.00	0.01	0.02	0.02	0.00	0.02	0.01
27	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00
MTOT	1.89	1.42	1.45	0.81	1.56	1.61	1.52	3.65	3.48	3.24	1.03
DEC											
10	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.01	0.00	0.02	0.00
12	0.00	0.41	0.95	0.00	0.47	0.46	0.63	0.64	0.62	0.55	0.53
13	0.00	0.36	0.00	0.00	0.24	0.22	0.30	0.14	0.12	0.17	0.44
14	0.00	0.00	0.03	0.06	0.10	0.09	0.12	0.00	0.00	0.07	0.06
15	0.00	0.03	0.01	0.03	0.04	0.03	0.05	0.05	0.00	0.03	0.02
18	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.16	0.02	0.03	0.01	0.06	0.04	0.02	0.19	0.24	0.17	0.00
23	0.23	0.24	0.21	0.16	0.17	0.21	0.25	0.22	0.33	0.19	0.22
28	0.91	1.81	1.65	1.12	2.41	2.46	2.28	0.59	0.66	1.02	2.13
MTOT	1.32	2.87	2.88	1.38	3.52	3.54	3.68	1.84	1.97	2.22	3.40
CTOT	38.02	33.63	31.04	30.90	33.84	34.62	36.46	37.09	34.42	29.83	31.00

MTOT=MONTHLY TOTALS
CTOT=CALENDAR YEAR TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY

PERIOD :1980 WATER YEAR

DATE	GAGE NUMBER										
	1-S	3-S	4-S	5-S	1-ES	2-ES	3-ES	1-H	2-H	3-H	1-A
JAN											
10	0.04	0.06	0.04	0.08	0.08	0.08	0.09	0.13	0.10	0.09	0.08
11	0.02	0.02	0.01	0.00	0.00	0.00	0.02	0.01	0.00	0.00	0.02
15	0.00	0.00	0.00	0.00	0.03	0.03	0.01	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00
17	0.08	0.07	0.12	0.03	0.08	0.20	0.17	0.13	0.25	0.19	0.05
19	0.03	0.01	0.05	0.01	0.05	0.05	0.06	0.00	0.01	0.04	0.00
20	0.18	0.23	0.15	0.17	0.86	0.56	0.34	0.32	0.25	0.15	0.09
21	0.07	0.10	0.15	0.20	0.17	0.22	0.27	0.05	0.12	0.11	0.19
22	0.17	0.18	0.22	0.35	0.28	0.17	0.22	0.18	0.17	0.14	0.14
28	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01
29	0.06	0.00	0.03	0.03	0.05	0.04	0.03	0.00	0.01	0.00	0.02
30	0.02	0.00	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.02
MTOT	0.67	0.67	0.78	0.88	1.63	1.37	1.23	0.84	0.95	0.75	0.62
FEB											
1	0.03	0.00	0.02	0.01	0.04	0.04	0.04	0.36	0.00	0.02	0.10
2	0.09	0.12	0.10	0.10	0.10	0.10	0.10	0.06	0.08	0.08	0.00
3	0.00	0.34	0.01	0.00	0.00	0.01	0.02	0.00	0.02	0.01	0.00
5	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00
7	0.02	0.01	0.04	0.02	0.00	0.03	0.05	0.01	0.01	0.00	0.02
8	0.02	0.18	0.14	0.20	0.00	0.15	0.30	0.02	0.02	0.14	0.40
9	0.05	0.02	0.01	0.07	0.00	0.04	0.07	0.12	0.12	0.06	0.07
10	0.00	0.01	0.00	0.01	0.00	0.01	0.02	0.01	0.00	0.00	0.00
14	0.01	0.02	0.01	0.03	0.00	0.04	0.05	0.06	0.09	0.08	0.05
15	0.20	0.11	0.11	0.25	0.19	0.14	0.19	0.13	0.27	0.48	0.24
16	0.13	0.21	0.24	0.22	0.25	0.23	0.21	0.15	0.15	0.14	0.21
17	0.06	0.03	0.05	0.04	0.10	0.07	0.09	0.04	0.06	0.05	0.02
18	0.01	0.02	0.00	0.02	0.00	0.01	0.02	0.01	0.01	0.01	0.01
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
MTOT	0.63	1.12	0.73	0.97	0.68	0.90	1.17	0.97	0.83	1.08	1.12

MTOT=MONTHLY TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY PERIOD :1980 WATER YEAR

DATE	GAGE NUMBER										
	1-S	3-S	4-S	5-S	1-ES	2-ES	3-ES	1-H	2-H	3-H	1-A
MAR											
6	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.01	0.00	0.12	0.00	0.03	0.04	0.02	0.00	0.01	0.01	0.01
16	0.06	0.02	0.24	0.08	0.04	0.07	0.03	0.02	0.02	0.02	0.03
17	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.01	0.01	0.00	0.00	0.04	0.03	0.03	0.00	0.00	0.00	0.03
20	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00
23	0.12	0.09	0.00	0.00	0.00	0.15	0.11	0.07	0.12	0.10	0.09
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.01	0.10	0.00	0.00	0.11	0.08	0.09	0.01	0.01	0.01	0.18
26	0.08	0.06	0.00	0.11	0.36	0.11	0.21	0.08	0.11	0.12	0.09
27	2.01	0.60	0.18	0.61	0.97	0.97	0.83	1.55	0.71	1.28	0.75
28	0.06	0.02	0.02	0.01	0.04	0.00	0.03	0.00	0.04	0.01	0.00
29	0.05	0.02	0.05	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
MTOT	2.41	0.93	0.66	0.81	1.62	1.45	1.37	1.73	1.02	1.55	1.18
APR											
1	0.08	0.22	0.20	0.14	0.00	0.18	0.21	0.06	0.03	0.04	0.07
2	0.06	0.02	0.01	0.00	0.00	0.05	0.05	0.05	0.07	0.03	0.02
3	0.00	0.01	0.01	0.00	0.00	0.01	0.01	0.00	0.04	0.03	0.00
7	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.15	0.12	0.17	0.13	0.22	0.19	0.22	0.41	0.39	0.18	0.18
13	0.07	0.21	0.16	0.11	0.00	0.07	0.08	0.12	0.09	0.09	0.10
25	0.72	1.12	1.63	0.94	1.50	1.36	1.33	1.07	1.10	1.31	0.91
MTOT	1.08	1.70	2.18	1.32	1.72	1.87	1.91	1.71	1.72	1.68	1.28

MTOT=MONTHLY TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY — PERIOD :1980 WATER YEAR

DATE	1-S	3-S	4-S	5-S	1-ES	2-ES	3-ES	1-H	2-H	3-H	1-A
MAY											
1	0.51	1.24	1.38	0.79	0.52	0.35	0.64	0.50	1.82	1.13	0.26
2	0.00	0.02	0.02	0.00	0.00	0.02	0.04	0.01	0.01	0.01	0.01
3	0.02	0.03	0.06	0.15	0.05	0.00	0.03	0.14	0.11	0.15	0.32
4	0.00	0.03	0.01	0.00	0.00	0.00	0.02	0.00	0.00	0.02	0.01
7	0.23	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00
8	0.49	0.57	0.59	0.63	0.66	0.75	0.85	0.82	0.97	1.16	0.36
9	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.03	0.03	0.02	0.00	0.01	0.00	0.00
12	0.08	0.09	0.11	0.12	0.20	0.09	0.07	0.13	0.09	0.10	0.04
13	1.47	1.07	1.68	0.94	2.44	1.68	1.39	1.73	1.25	1.22	1.07
14	0.60	1.52	0.92	0.96	0.38	0.37	0.43	0.47	0.53	0.47	0.88
15	0.76	0.20	0.84	1.22	0.74	2.58	2.32	0.33	0.37	0.60	1.10
16	0.00	0.64	0.64	0.80	0.91	0.40	0.83	0.79	0.77	0.60	0.90
17	0.00	0.04	0.00	0.02	0.00	0.01	0.04	0.01	0.03	0.02	0.06
18	0.80	0.83	1.54	0.98	1.12	0.37	0.77	0.72	0.85	0.53	0.39
19	0.01	0.00	0.07	0.06	0.00	0.01	0.04	0.00	0.04	0.00	0.02
21	1.29	0.01	0.49	1.02	0.76	0.53	1.08	0.34	0.66	0.95	0.59
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
27	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.04	0.02	0.03	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MTOT	6.31	6.30	8.35	7.69	7.81	7.22	8.57	6.03	7.53	7.00	6.01
JUN											
21	1.26	1.14	1.26	0.06	1.46	1.75	2.03	0.27	0.06	0.00	0.00
MTOT	1.26	1.14	1.26	0.06	1.46	1.75	2.03	0.27	0.06	0.00	0.00
JUL											
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.29	0.00	0.80	1.14	0.35	0.00	0.00	0.00	0.86
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.04	0.03	0.00	0.28	0.18	0.26	0.03	0.19	0.03	0.00
29	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MTOT	0.00	0.04	0.34	0.00	1.08	1.32	0.61	0.03	0.19	0.03	0.86

MTOT=MONTHLY TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY PERIOD :1980 WATER YEAR

DATE	GAGE NUMBER										
	1-S	3-S	4-S	5-S	1-ES	2-ES	3-ES	1-H	2-H	3-H	1-A
AUG											
6	0.15	0.08	0.20	0.23	0.00	0.00	0.02	0.08	0.23	0.27	0.26
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
9	0.09	0.31	0.60	0.03	0.00	0.09	0.17	0.15	0.15	0.03	0.18
10	1.66	1.50	1.85	3.14	1.31	1.78	1.62	2.05	2.13	2.02	2.91
11	0.19	0.09	0.00	0.13	0.79	0.11	0.13	0.32	0.45	0.24	0.19
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
17	0.00	0.02	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14
18	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.15	0.29	0.52	0.00	0.10	0.05	0.00	0.00	0.00	0.00
27	0.17	0.00	0.00	0.00	0.27	0.18	0.14	0.00	0.00	0.00	0.00
31	0.00	0.11	0.02	0.01	0.05	0.05	0.05	0.00	0.00	0.00	0.10
MTOT	2.30	2.26	3.15	4.06	2.42	2.31	2.18	2.60	2.96	2.57	3.82
SEPT											
2	0.17	0.00	0.00	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	1.27	2.00	2.25	2.20	2.14	1.76	1.85	1.37	1.25	1.32	2.31
7	2.14	1.56	1.82	1.54	3.03	2.50	2.62	2.94	1.97	2.44	0.95
8	0.03	0.03	0.01	0.01	0.00	0.07	0.00	0.03	0.05	0.03	0.04
9	0.10	0.00	0.06	0.10	0.00	0.04	0.00	0.59	0.72	0.37	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
19	0.14	0.00	0.00	0.00	0.99	0.63	0.49	0.00	0.06	0.00	0.18
25	2.07	0.28	0.07	0.49	0.57	1.10	0.83	1.42	1.97	0.31	0.59
26	0.40	0.08	0.14	0.17	0.37	0.27	0.24	0.48	0.45	0.28	0.34
27	0.26	0.19	0.31	0.37	0.65	0.60	0.43	0.92	1.05	1.03	0.49
28	0.02	0.13	0.28	0.16	0.10	0.18	0.18	0.66	0.58	0.53	0.00
29	0.02	0.00	0.00	0.03	0.00	0.00	0.00	0.02	0.04	0.00	0.00
30	0.43	0.51	0.53	0.32	0.32	0.24	0.25	0.04	0.02	0.13	0.10
MTOT	7.05	4.78	5.47	5.65	8.17	7.39	6.89	8.47	8.16	6.45	5.00
WTOT	24.92	23.30	27.41	23.71	31.67	30.91	31.34	28.14	28.87	26.57	24.37

MTOT=MONTHLY TOTALS
WTOT=WATER YEAR TOTAL

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY

PERIOD :1980 WATER YEAR

DATE	GAGE NUMBER									
	1-L	2-L	4-L	1-WH	1-0	2-0	3-0	4-0	1-LO	NOAA
OCT										
15	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	******	0.00
22	0.14	0.01	0.00	0.00	0.00	0.00	0.00	0.00	******	0.01
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	******	0.00
30	0.08	0.28	0.15	0.06	0.11	0.00	0.04	0.05	******	0.10
MTOT	0.24	0.29	0.15	0.06	0.11	0.00	0.04	0.05	******	0.11
NOV										
6	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	******	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	******	0.01
17	2.35	1.70	0.31	0.38	0.34	0.36	0.41	0.39	******	0.60
18	0.02	0.02	0.02	0.01	0.00	0.01	0.01	0.00	******	0.01
19	0.01	0.00	0.01	0.00	0.00	0.01	0.00	0.00	******	0.01
20	0.35	0.21	0.00	0.01	0.11	0.04	0.07	0.00	******	0.08
21	0.22	0.19	0.21	0.54	0.00	0.25	0.00	0.40	******	0.43
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	******	0.00
24	0.31	0.21	0.30	0.00	0.00	0.28	0.00	0.28	******	0.29
25	0.00	0.00	0.02	0.02	0.00	0.00	0.00	0.00	******	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	******	0.00
MTOT	3.26	2.33	0.87	0.97	0.45	0.95	0.49	1.08	******	1.43
DEC										
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	******	0.01
11	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.00	******	0.00
12	0.48	0.59	0.24	0.41	0.90	0.79	0.00	0.30	******	0.49
13	0.14	0.11	0.26	0.21	0.23	0.15	0.00	0.48	******	0.39
14	0.01	0.00	0.05	0.02	0.02	0.15	0.00	0.02	******	0.03
15	0.03	0.11	0.02	0.01	0.01	0.00	0.00	0.00	******	0.02
18	0.00	0.04	0.00	0.00	0.00	0.06	0.00	0.00	******	0.00
21	0.17	0.08	0.00	0.00	0.03	0.03	0.00	0.00	******	0.01
23	0.38	0.23	0.20	0.15	0.18	0.21	0.10	0.28	******	0.26
28	0.82	1.28	0.67	1.17	2.50	2.74	0.90	1.70	******	1.65
MTOT	2.06	2.44	1.45	1.97	3.87	4.13	1.00	2.78	******	2.86
CTOT	35.20	32.17	27.21	30.51	30.15	30.65	27.72	31.83	******	36.64

MTOT=MONTHLY TOTALS
CTOT=CALENDAR YEAR TOTALS

```
:===============================================================================================================================:
:                           S A N   A N T O N I O   U R B A N   H Y D R O L O G Y   S T U D Y                                   :
:-------------------------------------------------------------------------------------------------------------------------------:
:      DAILY AND MONTHLY RAINFALL SUMMARY                                                    PERIOD :1980 WATER YEAR            :
:-------------------------------------------------------------------------------------------------------------------------------:
:        :                                           G A G E   N U M B E R                                                      :
:  DATE  :----------------------------------------------------------------------------------------------------------------------:
:        :    1-L    :    2-L    :    4-L    :   1-AM    :    1-0    :    2-0    :    3-0    :    4-0    :   1-L0    :   NOAA    :
:===============================================================================================================================:
:  JAN   :           :           :           :           :           :           :           :           :           :           :
:   10   :      0.07 :      0.11 :      0.02 :      0.05 :      0.00 :      0.04 :      0.04 :      0.05 :   ******* :      0.08 :
:   11   :      0.00 :      0.00 :      0.01 :      0.01 :      0.00 :      0.01 :      0.01 :      0.00 :   ******* :      0.00 :
:   15   :      0.01 :      0.00 :      0.00 :      0.00 :      0.00 :      0.00 :      0.00 :      0.00 :   ******* :      0.00 :
:   16   :      0.00 :      0.00 :      0.00 :      0.00 :      0.00 :      0.00 :      0.00 :      0.00 :   ******* :      0.00 :
:   17   :      0.13 :      0.35 :      0.00 :      0.00 :      0.00 :      0.01 :      0.04 :      0.04 :      0.01 :      0.11 :
:   19   :      0.00 :      0.00 :      0.00 :      0.00 :      0.00 :      0.01 :      0.00 :      0.00 :      0.01 :      0.00 :
:   20   :      0.08 :      0.28 :      0.00 :      0.17 :      0.00 :      0.11 :      0.08 :      0.12 :      0.62 :      0.26 :
:   21   :      0.10 :      0.05 :      0.09 :      0.37 :      0.00 :      0.11 :      0.19 :      0.12 :      0.13 :      0.08 :
:   22   :      0.15 :      0.13 :      0.24 :      0.19 :      0.26 :      0.22 :      0.20 :      0.17 :      0.18 :      0.15 :
:   28   :      0.00 :      0.00 :      0.00 :      0.00 :      0.00 :      0.00 :      0.00 :      0.00 :      0.00 :      0.01 :
:   29   :      0.09 :      0.00 :      0.00 :      0.06 :      0.01 :      0.02 :      0.02 :      0.01 :      0.04 :      0.03 :
:   30   :      0.02 :      0.00 :      0.00 :      0.02 :      0.01 :      0.02 :      0.03 :      0.01 :      0.02 :      0.00 :
:===============================================================================================================================:
:  MTOT  :      0.65 :      0.92 :      0.36 :      0.87 :      0.28 :      0.55 :      0.61 :      0.52 :   ******* :      0.72 :
:===============================================================================================================================:
:  FEB   :           :           :           :           :           :           :           :           :           :           :
:    1   :      0.00 :      0.00 :      0.00 :      0.01 :      0.01 :      0.03 :      0.01 :      0.00 :      0.03 :      0.01 :
:    2   :      0.10 :      0.06 :      0.08 :      0.10 :      0.10 :      0.09 :      0.08 :      0.10 :      0.10 :      0.11 :
:    3   :      0.00 :      0.00 :      0.00 :      0.01 :      0.00 :      0.00 :      0.00 :      0.00 :      0.02 :      0.00 :
:    5   :      0.00 :      0.00 :      0.00 :      0.00 :      0.00 :      0.00 :      0.00 :      0.00 :      0.00 :      0.00 :
:    7   :      0.00 :      0.00 :      0.00 :      0.02 :      0.01 :      0.02 :      0.04 :      0.02 :      0.02 :      0.03 :
:    8   :      0.09 :      0.07 :      0.12 :      0.22 :      0.05 :      0.05 :      0.02 :      0.11 :      0.21 :      0.20 :
:    9   :      0.08 :      0.00 :      0.06 :      0.06 :      0.07 :      0.17 :      0.11 :      0.03 :      0.10 :      0.02 :
:   10   :      0.00 :      0.00 :      0.00 :      0.01 :      0.00 :      0.00 :      0.00 :      0.00 :      0.01 :      0.00 :
:   14   :      0.08 :      0.00 :      0.05 :      0.07 :      0.03 :      0.03 :      0.04 :      0.05 :      0.05 :      0.03 :
:   15   :      0.38 :      0.35 :      0.11 :      0.20 :      0.10 :      0.28 :      0.34 :      0.08 :      0.15 :      0.11 :
:   16   :      0.20 :      0.02 :      0.24 :      0.04 :      0.20 :      0.14 :      0.22 :      0.25 :      0.21 :      0.18 :
:   17   :      0.03 :      0.00 :      0.01 :      0.02 :      0.02 :      0.06 :      0.04 :      0.04 :      0.07 :      0.05 :
:   18   :      0.01 :      0.00 :      0.01 :      0.01 :      0.01 :      0.01 :      0.02 :      0.01 :      0.01 :      0.00 :
:   21   :      0.00 :      0.00 :      0.00 :      0.09 :      0.00 :      0.00 :      0.00 :      0.00 :      0.02 :      0.00 :
:   28   :      0.00 :      0.00 :      0.00 :      0.00 :      0.00 :      0.00 :      0.00 :      0.00 :      0.01 :      0.00 :
:   29   :      0.00 :      0.00 :      0.00 :      0.00 :      0.00 :      0.00 :      0.00 :      0.00 :      0.02 :      0.00 :
:===============================================================================================================================:
:  MTOT  :      0.97 :      0.50 :      0.68 :      0.86 :      0.60 :      0.88 :      0.92 :      0.69 :      1.03 :      0.74 :
:===============================================================================================================================:
:===============================================================================================================================:
MTOT=MONTHLY TOTALS
```

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY PERIOD :1980 WATER YEAR

DATE	GAGE NUMBER									
	1-L	2-L	4-L	1-AH	1-U	2-U	3-U	4-U	1-LU	NOAA
MAR										
6	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.02	0.02
16	0.05	0.00	0.01	0.22	0.00	0.03	0.02	0.03	0.03	0.00
17	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.01	0.01	0.03	0.01	0.00	0.03	0.00
20	0.00	0.00	0.00	0.01	0.00	0.02	0.00	0.00	0.00	0.00
22	0.11	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.02	0.05	0.08	0.09	0.08	0.07	0.11	0.12
24	0.00	0.00	0.01	0.00	0.00	0.00	0.12	0.00	0.00	0.00
25	0.02	0.00	0.14	0.14	0.02	0.05	0.11	0.18	0.08	0.18
26	0.04	0.00	0.04	0.09	0.09	0.10	0.08	0.07	0.08	0.09
27	1.77	0.86	0.74	0.72	0.70	0.95	0.77	0.57	0.82	0.55
28	0.02	0.00	0.10	0.02	0.02	0.04	0.01	0.02	0.02	0.00
29	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.02
MTOT	2.09	0.98	1.08	1.27	0.93	1.34	1.21	0.94	1.19	0.98
APR										
1	0.03	0.00	0.00	0.02	0.09	0.10	0.08	0.04	0.18	0.16
2	0.06	0.04	0.01	0.01	0.02	0.03	0.03	0.02	0.03	0.03
3	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.06
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
12	0.20	0.13	0.19	0.32	0.04	0.05	0.20	0.57	0.14	0.32
13	0.12	0.05	0.07	0.03	0.07	0.07	0.08	0.11	0.10	0.10
25	1.19	1.14	0.77	0.86	1.93	1.50	1.27	0.99	1.27	1.00
MTOT	1.60	1.36	1.05	1.24	2.15	1.75	1.66	1.74	1.73	1.67

MTOT=MONTHLY TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY   PERIOD :1980 WATER YEAR

DATE	GAGE NUMBER									
	1-L	2-L	4-L	1-WH	1-0	2-0	3-0	4-0	1-LO	NOAA
MAY										
1	1.40	1.29	0.28	0.01	0.81	0.61	0.76	0.45	0.42	0.70
2	0.00	0.00	0.12	0.01	0.02	0.03	0.02	0.02	0.02	0.00
3	0.09	0.00	0.34	0.05	0.00	0.07	0.08	0.14	0.04	0.07
4	0.00	0.00	0.01	0.00	0.01	0.02	0.01	0.00	0.01	0.00
7	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00
8	0.79	0.41	0.74	1.31	0.99	0.75	0.72	0.54	0.63	0.58
9	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.01
12	0.14	0.82	0.03	0.09	0.04	0.11	0.03	0.01	0.06	0.07
13	1.30	0.50	0.56	1.19	2.32	1.86	1.08	1.37	0.90	1.13
14	0.60	0.44	0.09	0.49	0.73	0.54	0.88	0.91	0.45	0.85
15	0.38	0.65	0.05	0.51	1.40	1.31	1.00	1.21	2.28	0.98
16	0.46	0.34	0.02	0.38	1.02	0.74	0.74	0.66	0.62	0.66
17	0.01	0.00	0.04	0.04	0.02	0.04	0.01	0.00	0.03	0.00
18	0.82	0.70	0.01	0.85	0.52	0.42	0.70	0.38	0.76	0.93
19	0.03	0.00	0.01	0.11	0.01	0.00	0.02	0.04	0.03	0.02
21	0.74	0.72	0.00	0.57	0.86	0.55	0.81	0.78	0.66	0.41
23	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00
27	0.03	0.00	0.00	0.00	0.03	0.06	0.02	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
MTOT	6.79	5.83	2.36	5.64	8.78	7.11	6.90	6.51	6.93	6.42
JUN										
21	0.27	0.10	0.00	0.00	0.04	0.11	0.04	1.33	1.10	0.52
MTOT	0.27	0.10	0.00	0.00	0.04	0.11	0.04	1.33	1.10	0.52
JULY										
21	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.02	0.29	0.11	0.09	0.66	0.56	0.88	0.82	0.99	0.13
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.36	0.13
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
MTOT	0.02	0.29	0.16	0.09	0.66	0.56	0.88	0.82	1.38	0.26

MTOT=MONTHLY TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY PERIOD :1980 WATER YEAR

DATE	GAGE NUMBER									
	1-L	2-L	4-L	1-4M	1-0	2-0	3-0	4-0	1-L0	NOAA
AUG										
6	0.01	0.30	0.22	0.00	0.00	0.15	0.53	0.00	0.10	0.27
7	0.00	0.00	0.00	0.00	0.25	0.02	0.00	0.00	0.00	0.07
9	0.11	0.13	0.16	0.53	0.00	0.00	0.00	0.00	0.09	0.43
10	1.77	1.57	2.49	5.06	1.97	1.62	2.45	2.41	1.35	1.49
11	0.00	0.38	0.16	0.26	0.22	0.22	0.00	0.20	0.09	0.08
14	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00
16	0.12	0.00	0.03	0.00	0.13	0.26	0.09	0.00	0.00	0.03
17	0.03	0.00	0.13	0.00	0.00	0.04	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.28	0.00	0.00	0.00	0.00	0.26	0.27
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.13	0.00	0.00	0.00	0.00	0.04	0.08	0.13	0.04	0.00
MTOT	2.17	2.38	3.19	6.17	2.57	2.40	3.15	2.74	1.93	2.64
SEP										
2	0.00	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00
6	1.92	0.00	0.62	1.08	1.64	1.45	2.34	3.10	1.58	2.62
7	2.01	1.24	0.47	0.75	1.63	1.52	1.58	1.47	0.00	1.55
8	0.20	1.33	0.39	0.00	0.03	0.01	0.08	0.00	0.00	0.01
9	0.00	0.00	0.24	0.04	0.07	0.01	0.01	0.02	0.00	0.00
10	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.04	0.00	0.00	0.00	1.78	1.27	1.02	0.20	0.72	0.01
25	1.25	0.96	0.00	0.00	0.68	0.90	0.62	0.42	1.13	0.04
26	0.47	0.43	0.35	0.26	0.32	0.20	0.34	0.26	0.17	0.18
27	0.41	0.39	1.04	0.48	0.37	0.36	0.45	0.25	0.33	0.22
28	0.10	0.00	0.01	0.00	0.02	0.02	0.00	0.00	0.03	0.09
29	0.00	0.03	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.03	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.11	0.33
MTOT	6.43	4.38	3.25	2.87	6.54	5.74	6.44	5.72	4.07	5.05
WTOT	26.55	21.80	14.60	22.01	26.98	25.52	23.34	24.92	******	23.40

MTOT=MONTHLY TOTALS

STA. NO. 08178555 STORM RAINFALL AND RUNOFF RECORD 1980 WATER YEAR

HARLANDALE CREEK AT WEST HARDING BLVD., SAN ANTONIO, TX. STORM OF MAY 13, 1980

DATE & TIME	GAGE NUMBER 1-WM							ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN CFS	ACCUM. RUNOFF IN.
MAY 13										
0000	0.0							0.0	0.0	0.0
1750	0.0							0.0	0.0	0.0
1755	0.03							0.03	0.0	0.0
1800	0.05							0.05	0.0	0.0
1815	0.06							0.06	0.0	0.0
1830	0.10							0.10	0.0	0.0
1945	0.30							0.30	0.0	0.0
1900	0.35							0.35	0.4	0.0001
1915	0.40							0.40	1.3	0.0003
1930	0.64							0.64	3.7	0.0009
1945	1.00							1.00	27.0	0.0052
2000	1.19							1.19	153.0	0.0255
2010	1.19							1.19	179.0	0.0540
2030	1.19							1.19	154.0	0.0827
2045	1.19							1.19	166.0	0.1003
2050	1.19							1.19	169.0	0.1407
2130	1.19							1.19	115.0	0.1835
2200	1.19							1.19	68.0	0.2052
2230	1.19							1.19	35.0	0.2163
2300	1.19							1.19	18.0	0.2221
2330	1.19							1.19	8.5	0.2248
2400	1.19							1.19	4.5	0.2255

STA. NO. 08178555 STORM RAINFALL AND RUNOFF RECORD 1980 WATER YEAR

HARLANDALE CREEK AT WEST HARDING BLVD., SAN ANTONIO, TX. STORM OF AUG 10-11, 1980

DATE & TIME	GAGE NUMBER 1-WH							ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN CFS	ACCUM. RUNOFF IN.
AUG 10										
0000	0.0							0.0	0.0	0.0
0010	0.0							0.0	0.0	0.0
0015	0.01							0.01	0.0	0.0
0030	0.02							0.02	0.0	0.0
0045	0.03							0.03	0.0	0.0
0100	0.03							0.03	0.0	0.0
0130	0.08							0.08	0.0	0.0
0200	0.11							0.11	0.0	0.0
0230	0.28							0.28	0.0	0.0
0245	0.47							0.47	0.0	0.0
0300	0.82							0.82	0.0	0.0
0315	1.38							1.38	0.0	0.0
0330	1.70							1.70	0.0	0.0
0345	1.71							1.71	0.0	0.0
0400	1.71							1.71	0.0	0.0
0430	1.73							1.73	0.0	0.0
0500	1.78							1.78	0.0	0.0
0530	1.86							1.86	0.0	0.0
0600	1.91							1.91	0.0	0.0
0615	1.95							1.95	0.0	0.0
0630	1.96							1.96	0.0	0.0
0700	2.01							2.01	0.0	0.0
0730	2.06							2.06	0.0	0.0
0800	2.13							2.13	0.0	0.0
0830	2.24							2.24	0.0	0.0
0845	2.31							2.31	0.0	0.0
0900	2.52							2.52	0.0	0.0
0930	2.69							2.69	0.0	0.0
0945	2.76							2.76	0.4	0.0001
1000	3.07							3.07	8.5	0.0014
1015	3.29							3.29	59.0	0.0124
1035	3.49							3.49	143.0	0.0352
1045	3.55							3.55	117.0	0.0507
1100	3.64							3.64	83.0	0.0640
1115	3.69							3.69	72.0	0.0774
1135	3.73							3.73	87.0	0.0912
1145	3.75							3.75	84.0	0.1024
1200	3.83							3.83	71.0	0.1194
1230	3.96							3.96	43.0	0.1331

STA. NO. 08178555 STORM RAINFALL AND RUNOFF RECORD 1980 WATER YEAR

HARLANDALE CREEK AT WEST HARDING BLVD., SAN ANTONIO, TX. STORM OF AUG 10-11, 1980

DATE & TIME	GAGE NUMBER							ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN CFS	ACCUM. RUNOFF IN.
	1-WH									
AUG 10										
1300	4.28							4.28	28.0	0.1465
1400	4.54							4.54	13.0	0.1548
1500	4.65							4.65	9.1	0.1591
1530	4.73							4.73	12.0	0.1629
1600	4.75							4.75	25.0	0.1709
1630	4.79							4.79	52.0	0.1875
1700	4.84							4.84	60.0	0.2066
1730	4.88							4.88	132.0	0.2487
1800	4.90							4.90	162.0	0.3262
1900	4.92							4.92	117.0	0.3821
1930	4.92							4.92	95.0	0.4049
1945	4.92							4.92	94.0	0.4198
2000	4.94							4.94	113.0	0.4469
2030	4.95							4.95	108.0	0.4985
2130	5.04							5.04	99.0	0.5459
2200	5.06							5.06	69.0	0.5789
2300	5.06							5.06	45.0	0.6076
2400	5.06							5.06	27.0	0.6183
AUG 11										
0000	5.06							5.06	27.0	0.6183
0030	5.06							5.06	22.0	0.6275
0100	5.06							5.06	18.0	0.6361
0200	5.06							5.06	8.5	0.6469
0500	5.06							5.06	2.4	0.6500
0600	5.06							5.06	1.1	0.6507
0700	5.16							5.16	0.5	0.6509
0730	5.32							5.32	0.3	0.6510
0800	5.32							5.32	0.0	0.6510
2400	5.32							5.32	0.0	0.6510

STA. NO. 08178690 STORM RAINFALL AND RUNOFF RECORD 1980 WATER YEAR

SALADO CREEK TRIBUTARY AT BITTERS ROAD, SAN ANTONIO, TX. STORM OF SEPT. 6, 1980

DATE & TIME	GAGE NUMBER							ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN CFS	ACCUM. RUNOFF IN.
	3-5									
SEP 6										
0000	0.0							0.0	0.0	0.0
0940	0.01							0.01	0.0	0.0
1000	0.05							0.05	0.0	0.0
1200	0.08							0.08	0.0	0.0
1300	0.08							0.08	0.0	0.0
1430	0.20							0.20	0.0	0.0
1500	0.28							0.28	0.0	0.0
1505	0.36							0.36	9.0	0.0089
1520	0.84							0.84	18.0	0.0313
1530	1.03							1.03	52.0	0.0700
1535	1.11							1.11	69.0	0.1214
1545	1.21							1.21	70.0	0.2083
1600	1.24							1.24	58.0	0.3380
1630	1.26							1.26	36.0	0.4453
1700	1.35							1.35	26.0	0.5227
1730	1.36							1.36	22.0	0.6539
1900	1.49							1.49	17.0	0.7805
2000	1.50							1.50	14.0	0.8431
2030	1.54							1.54	11.0	0.8677
2045	1.77							1.77	14.0	0.8816
2050	1.79							1.79	21.0	0.8972
2100	1.80							1.80	24.0	0.9449
2130	1.81							1.81	38.0	1.0581
2200	1.81							1.81	23.0	1.1609
2300	1.82							1.82	13.0	1.2384
2400	2.00							2.00	11.0	1.2712